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Henry Harding

# THE
# DOCKYARDS, SHIPYARDS,
# AND
# MARINE OF FRANCE.

BY

P.atrick BARRY,

AUTHOR OF

"DOCKYARD ECONOMY AND NAVAL POWER," &c.

LONDON:
SIMPKIN, MARSHALL, AND CO.,
STATIONERS' HALL COURT.

1864.

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Eng 5058.64

MAR -6 1912
HARVARD UNIVERSITY
DEPARTMENT OF ENGINEERING.

TO

DE S. E. LE COMTE DE CHASSELOUP-LAUBAT,

MINISTRE SECRÉTAIRE D'ÉTAT DE LA MARINE

ET DES COLONIES;

THE ADMIRALS COMMANDING IN THE FRENCH DOCKYARDS;

THE OFFICERS COMMANDING THE FRENCH IRONCLADS;

THE RESIDENT CONSULS,

AND OTHERS, WITH WHOM I CAME IN CONTACT,

OR WHO DIRECTLY OR INDIRECTLY

ASSISTED ME IN PROSECUTING MY INQUIRIES INTO

THE SUBJECT-MATTER OF THE PRESENT VOLUME,

MY BEST THANKS ARE DUE.

# PREFACE.

The writer of the present volume visited the French dockyards and shipyards for the purpose of ascertaining by personal observation what France really is about, and what France really is capable of doing, in the event of a European war. This information the writer desired that, in his profession as a public writer on ships of war and guns, he might the more efficiently discharge his daily duty. The French Government, assured by the friendly tone of the writer's previous book on the English dockyards, at once acceded to his wishes, and without stipulation or restriction opened their establishments.* As Lord Clarence Paget, our

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* Cabinet du Ministre Année 1864,
Mouvements. Mois de Janvier et de Février.
MARINE ET COLONIES.
Monsieur P. Barry, Rédacteur du ————————, est autorisé à visiter les établissements de la Marine à Cherbourg, Brest, Lorient, Rochefort, et Toulon.
Le Ministre Secrétaire d'Etat de la
Signature du Porteur, Marine et des Colonies,
P. Barry. Le Comte Chasseloup-Laubat.
Nota.—Sur la présentation de cette carte il sera délivré par les Préfets maritimes ou par les directeurs hors des Ports les permissions nécessaires pour visiter les établissements de la Marine.

Naval Attaché, the engineers sent by Mr. W. S. Lindsay and Sir Morton Peto, and the officers of the *St. George* accompanying Prince Alfred, have met with rebuffs and exclusion, the fact of an humble member of the London press, in his official capacity, receiving *carte blanche*, is perhaps one of the greatest compliments ever paid to the Fourth Estate by a Foreign Government.

On returning from France, and resolving to write the present volume, the question of the plan to be adopted at once occurred. The book might be written in two very different ways: first, the writer might work up a series of propositions which might or might not be warranted by what he saw and heard; or, second, he might merely state what he saw and heard, leaving the public to form their own opinions. Against the first course there was the objection of assuming the position of a pleader; and against the second there was the objection that, by investigating the facts of the case, matter of a less or more tedious character would probably be introduced, and necessarily there would be a certain amount of verbal repetition. What was to be done? A moment's deliberation was enough. On so important a question as the French Dockyards and Shipyards, Englishmen will prefer anything to what might appear to be the fancies or prejudices of any one. Arriving at that conclusion, it then seemed desirable to open the subject of the Dockyards with a general chapter, in which topics common to all the French Dockyards might be discussed, and to open the subject of the Shipyards in the same manner. These general chapters written, it further appeared that if they were followed by the facts in special chapters the book would resolve itself into two syllogisms,—the general chapters being the conclusions, and the special chapters the premises, from which the conclusions followed. The idea seemed a good one, and with ample leisure might have been neatly worked out, but unfortunately the writer has no leisure, and at the present time the subject of the French Dockyards and Shipyards is one that will not "keep." It therefore remained to do the best under the circumstances, and the best appeared to be to make every French feature or point a peg on which to hang a short discussion, until the entire field of naval controversy was fully covered. So the reader—the candid reader—desiring to be informed of French naval matters and their bearings, should wade through the book, from the first page to the last, because passages not in themselves obvious are pretty sure to be cleared up before the book is closed and laid away. Indeed, it has been the constant aim of the writer either to give his authority or to furnish the proof of what he states.

One word more. The writer has throughout the volume expressed himself as becomes his subject. He has spoken the truth, the whole truth, and, as far as he is aware, nothing but the truth. England, above all things, ought to know what France is doing, and what is inevitable in case of a rupture with France, should the British Navy remain the mere convenience of the Administration of the day. In the present condition of the British Navy, war with France would bring England to its knees in a single week or fortnight; but war with France, in the condition in which the British Navy might be placed by such men as Richard Cobden or Lord Stanley at the Admiralty, would assuredly bring Frenchmen and France to grief. As long as England is afflicted with a weak Government, no administrative reform worth a farthing rushlight will be ventured on; and as long as a system so incapable and *effete* as that represented by the Admiralty is tolerated by Parliament and the public, naval pre-eminence and glory are impossible. To affirm with Lord Palmerston that the British fleet is ready to go anywhere and to accomplish anything is to assume that the Navy is controlled by wise heads and vigorous hands; while to affirm with the writer that without amendment the British fleet has only to show itself against France to be thrashed and sunk, or captured, is to assume that the Navy in its management is rather more than a century behind the times. At no period in the country's history has the British Navy been practically more useless than it is at present. Send our handful of a Channel fleet to Denmark, and if in the Austro-Prussian service there is a Cochrane or a Napier, he has only to lay hands on a Channel pilot to be enabled to burn Woolwich. For the constant defence of England the writer enjoins the presence of the bulk of the commissioned ships in English waters; and for the supremacy of the British Navy he thinks there is nothing requisite but better guns and faster ships. In the opinion of the French naval officers commanding the French ironclads he concurs, that as good guns and ammunition will sink even that latest prodigy the *Lord Warden* by a few fair rounds, the time has come when ironclad and iron-armoured shipbuilding should make a pause.

A considerable amount of matter, some of great interest, will be found in the form of foot-notes. Such matter would have proved an incumbrance to the text.

**London, July 6th, 1864.**

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# THE FRENCH DOCKYARDS.

## CHAPTER I.

Their objects.

Two objects have been kept in view by the creation of the French Dockyards, the historical details of which need not be repeated. The first, and earliest, had reference to the construction and armament of ships of war; the second, and later, to the interests of those in power. Sometimes one set of causes operated alone, and sometimes both were combined. At a still later period—namely, in our own day, the great object of the French Dockyards has been, and is, the perpetuation of the Napoleonic dynasty. Let us briefly consider the different objects.

The construction and armament of ships.

The France of some two or three hundred years ago was in a condition resembling the England of the same period. Unscrupulous nobles and princes, agreeing in nothing but the subjection of the inferior classes, occupied themselves with intrigues, alliances, and wars. When not so engaged, conspiracies, treacheries, and butcheries formed the staple relaxation. Peace at the best was but a season of preparation for approaching conflict. Industry, at the best, suffered so grievously from interruptions and exactions, that it is not more surprising that those devoted to it prospered, than that the products of any single century exhibited improvement on those preceding. Still, it is remarkable, that out of the stagnation wrong and ambition led the way. When Catholic or Protestant propagandists enforced their ascendancy, they had, as a rule, previously conciliated those from whom arms and supplies were to be received; unless, when it happened, that supplies and arms were taken forcibly. When great wars were engaged in, and spread over lengthened periods, crowned heads sometimes became subservient to honest burghers. In a word, two or three hundred years ago, neither France nor England possessed any considerable foreign commerce, and their domestic dealings were exceedingly circumscribed. Each petty district was in the main self-supporting, not in the necessaries of life merely, but in most of the luxuries also. Internal communication was undeveloped because there were few commodities to exchange, and creating for personal or local consumption necessarily implied the absence of that division of trades which is so marked a feature of the present time. In what manner workmen were hired for the first French dockyards it is, perhaps, impossible to say. Either they were forced to devote themselves to the public service, or they were allured by high remuneration. The former is the more probable. It is likely that those following the occupations of shipwrights and armourers were in France obliged to aid the State, because to this day the usage still survives. They, no doubt, were drafted from all parts to establish in the chosen seats of power shops of the same character as those from which they had been withdrawn; shops, however, which owing to the aggregation eclipsed the previous efforts of private enterprise. Thus war enlarged the views of all classes. The aggregation of shops for aggressive or defensive purposes demonstrated the possibility of organising and setting in combined successful operation a great variety of different callings.

Necessity of the early Dockyards.

As it is the case that within a comparatively recent period the foreign trade of England even has received its great development, and that naval wars long preceded canals, macadam roads, and railways, it follows, that without Dockyards in the olden time actions at sea of any great importance could not possibly have been fought. Without them there could practically have been neither ships nor armaments. From Paris, Toulon is not less distant than 600 miles; Cherbourg, Brest, Lorient, and Rochfort are not so far, but still they are sufficiently removed to have been inaccessible for *matériel* in the total absence of good roads, or of any better means of transport than the backs of mules or bullock carts. So in the early French Dockyards, as in those of England, it was imperative to establish on the spot, that is, at the chosen seats of power, all the industry entering into the construction and armament of fighting-ships. Keel blocks had to be laid down, on good foundations, for the ships themselves. The next requisites were sheds and saw-pits, in which wood-converting was carried on. Then came the blacksmith's shop, the sailmaker's shop, the rope walk, and other minor places in which all the parts of ships might be fashioned and put together, and in which cannon and other weapons could be produced. The early Dockyards, French and English, were therefore a necessity. To have been without them would have been a condition with no pretension as a naval Power, and to have discarded them would have been to relinquish such pretension. No encouragement that could have been offered, and no Parliamentary or Kingly scheme that could have been devised, would have served to relieve Governments from the responsibility of supplying themselves with ships and armaments on the terms that the circumstances of the times inexorably imposed. It is remarkable that the necessity for Dockyards should still be claimed in ignorant and official circles. Frenchmen, however, seldom fail to distinguish between the two periods. In England the private war manufacturing establishments, from absolute non-existence when the Dockyards were first established, have within recent years become equal to the task of supplying the whole world in the most conceivably destructive period. Those of France have not made corresponding progress, but the progress, such as it is, has received the unqualified appreciation of the Emperor and successive Ministers of Marine. The French rule is to subordinate and employ the private industry of the country to the public wants. French public and private industry advance hand in hand, while in England we have as yet advanced no further towards *rapprochement* than Admiral Robinson indicated last year when incompetency and sharp practice were charged against the shipbuilders.*

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* As we have no wish to be supposed to do injustice to Admiral Robinson, we shall give him the benefit of his own words:—

*Statement relating to the Advantages of Iron and Wood, and the relative cost of these Materials in the Construction of Ships for Her Majesty's Navy.*

Admiralty, 2 March, 1863.

Taking it for granted that it is essential for this country to possess a number of ships armour-plated, equal to that of any other Power, the first consideration must be with regard to such ships as we require, whether they shall be of wood or iron.

There are two important points involved in this consideration:

1. The nature of the material.

Iron possesses these advantages over wood.

The second object.

The second object of the French Dockyards is peculiarly, if not exclusively, French. Few countries have been so much the sport of domestic discord, and there are few the pages of whose history is so darkened with civil crime. Revolution, especially in

---

An iron ship can be built of larger dimensions than a wooden ship, with no loss of strength.

An iron ship has more rigidity and strength of structure, as a whole, than a wooden ship, though locally weak and liable to be penetrated by blows, which would fall harmlessly on a wooden ship.

An iron ship has much greater durability in certain parts of the structure, indeed in all parts where no wood is in contact with the iron, than a wooden ship; and after a lapse of years the iron frame would have suffered next to nothing as compared with a wooden ship.

But against these advantages must be set,—

The serious local weakness of the comparatively thin plates of which the bottom of an iron ship is necessarily composed;

The danger, consequently, of getting on rocks in such ships; and

The necessity which this weakness entails of constructing double bottoms, thwartship bulkheads, watertight compartments, sluice-doors, &c., and various other complicated arrangements, which add both to the weight and cost of an iron ship.

The rapidity with which the bottom of an iron ship gets foul, and the immense loss of all the ship's qualities that follows from the adhesion of marine zoophytes. No practical remedy has been found for this serious disadvantage; repeated docking and cleaning is the only palliative.

The extreme uncertainty as to the quality of the material used,—in fact, the small quantity of real good iron of the best ship-building qualities that can be found in the market.

The prodigious ravages caused by the splinters of iron when the plates are broken and smashed by shot; and,

The far greater facility with which iron ships can be pierced below their armour-plating by submarine guns than wooden ships.

Lastly, as the progress that may be made by artillery and all destructive agents of warfare is quite without a limit, the immense price paid in an iron ship for durability may not be an advantage, as new forms for ships of war may, before long, be absolutely requisite: the iron ship of to-day, for which so large a price has been paid, may not be the weapon we require to-morrow. It may prove, therefore, wiser and more economical to supply the wants of the moment by a cheaper and less durable structure, which at least is of the same quality as those with which we may have to contend.

The most able designer of war ships in Europe, whose success has been so remarkable, Mr. Dupuy de L'Ome, is of this opinion, and constructs the ships that are to form the French line-of-battle, of wood, in preference to iron.

2. The second point to be considered in this question is,—

Where and how the ships, whether of wood or iron, shall be constructed.

If iron is the material preferred, we have the choice of either incurring a large outlay in our dockyards for the requisite plant, or of building by contract. In one dockyard only (Chatham) we can build in iron without any fresh expense.

If, therefore, we take the other alternative, and build by contract, the following serious disadvantages attend upon our doing so.

The first practical fact that comes before us is that—

In no one instance have the contractors kept to their agreements with the Government, either as to *time* or *cost*.

earlier times, seldom was completed until the Dockyard strongholds changed masters, and the retention of the Dockyards in troubled periods often gave anxiety to those in power. Against civil discord, it has been said that the French Dockyards were first protected by

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Though the cases are notorious, and will be found in a tabulated form annexed to this paper, I will quote one or two instances:—

The *Warrior* was ordered on the 11th of May, 1859; the contractors agreed to deliver her complete in July, 1860. She was delivered on the 20th of September, 1861, and not quite completed till the 24th of October, 1861.

The contractors agreed to build her for £210,225, including extras. They claimed, and ultimately received, £254,728.

The *Black Prince* was ordered on the 6th of October, 1859. The contractors agreed to deliver her, complete, on the 10th of October, 1860. She was delivered, incomplete, on the 18th of November, 1861. She was not completed for some months afterwards by the artificers of the dockyard.

The contractors agreed to build her for £230,254. They have claimed for her £259,751, and part of this claim is still under consideration; she has, however, cost the Admiralty, up to this time, £249,751.

In both these ships, but more particularly in the *Warrior*, some delay was occasioned in completing the ships by the alterations made in the course of building.

The *Defence* was delivered, incomplete, four months after the contractors' agreement.

The *Resistance* was delivered, incomplete, ten months after the contractors' agreement.

The *Hector*, if delivered in the course of the month of March, will be seven months behind the time agreed upon.

The *Valiant* should have been delivered, according to the original contract, in August, 1862; the contractors failed, and requested the Admiralty to annul their agreement. Another contract was made, with a fresh party, to deliver the ship in March, 1863; there is no prospect whatever of the work being finished for six months after that date.

The same or even greater delay has taken place in the delivery of the *Orontes* and *Tamar*, although these are of simple construction, and are not armour-plated.

There is no prospect that more than one out of the four iron ships last ordered will be delivered till many months after the periods agreed upon.

It is not, therefore, *one* contractor, or *one* iron-shipbuilder, but *all* who have failed in their agreements, and this clearly indicates the great uncertainty attending this mode of construction.

Two other difficulties present themselves:—

1. The general slovenliness of the work performed by iron-shipbuilders, rendering the presence of an Admiralty inspector necessary on the premises wherever the contract ships are building, and leading to many difficulties between the contractors and the Admiralty; and,

2. The great temptations that beset the contractors, owing to the cost and difficulty of procuring good iron, to use inferior and cheaper material.

Again, after a contract is signed, no alteration or improvement, however great, can be made without submitting to any terms the contractor chooses to enforce.

Strikes of workmen, strikes of colliers, disputes in trades, all interfere with the progress of the work, and always to the prejudice of the Government.

But, if wood be the material selected, the place of building will be our own dockyard, with all the plant, appliances, and materials already at home.

permanent fortifications on the landward sides. A mob had to be kept at bay, as well as the dashing British naval officers of the old school. The construction of permanent fortifications led, as a matter of course, to extensions of establishments, until it was impossible to

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No more money will be required than what already appears in the Navy Estimates; whereas,

If the ships are built of iron by contract, the whole of the money required to do so must be voted separately, and in addition to the ordinary Navy Estimates, and the increase of the total charge to the country could only be diminished in a very small degree, if at all, by the discharge of a limited number of workmen from some of the yards, who in such a case are entitled to pensions or gratuities, for it would still be necessary to retain that large portion of workmen who are employed in repairs, fitting and refitting ships, and in building the smaller classes which are essential for the protection of our trade in the distant corners of the globe.

In every way, therefore, the system of building by contract armour-plated iron ships would be more expensive than building armour-plated ships of wood in our dockyards.

The wooden ship, though in some respects inferior in rigidity to the iron, and not quite so strong as a whole, is yet, if we may believe the detailed accounts we have received of such ships as the *Gloire*, *Normandie*, *Magenta*, and *Solferino*, perfectly sufficient for the weight it has to bear.

Very bad weather has had no effect upon the *Gloire*, a wooden ship plated from stem to stern, and therefore far more heavily loaded and more severely tried than any of our iron armour-plated ships have yet been; none of these ships having armour-plates at their extremities.

Great addition to the strength of the wooden structures is given by iron beams, iron decks, filling in between the timbers, diagonal bracing, &c.; and, taking all the circumstances of the case into consideration, it seems decidedly preferable, *at the present time*, to build these ships in our dockyards of wood, rather than in private yards and of iron.

As a comparison, the probable cost of the *Hector* and *Valiant*, armour-plated ships, has been taken; though being only partially armour-plated, and the accounts not yet completed, an addition must be made, to compare these with the wooden ships proposed to be built.

| | | |
|---|---|---|
| Cost of a ship of 4,063 tons, iron and partially armour-plated, if built by contract ........................................... | | £206,000 |
| Add (estimate), if wholly plated ....................................... | | 8,000 |
| | | £214,000 |
| Cost of a wooden ship of 4,200 tons, and of greater strength than those now building, wholly armour-plated, for wages and materials (estimated) ...... | £170,000 | |
| Add, as in the case of private firms, for general charges incident to the above, 10 per cent. ......... | 17,000 | |
| Cost of the wooden ship built in the dockyard ...... | | £187,000 |

The cost of building the *Royal Oak*, as furnished by the accountant of Chatham Dockyard, for labour and materials, with 2 per cent. added, is one hundred and fifty-one thousand nine hundred and seventy pounds, including the value of materials think of Dockyards apart from the probable, if not also the possible, requirements of the future. Thus dynastic or ruling considerations have operated apart, and sometimes very powerfully, without reference to naval considerations. They have conferred an importance which otherwise would not have been attained; in a word, saddled France with great establishments, which, in a certain sense, it was, and still may be, wiser to continue than to level with the ground. In England no such cause can be said to have ever operated. True, we also have had our domestic troubles, but they have long ceased, while those of France, although comparatively bloodless, have continued. It is, however, worthy of remark that military officers, probably without any knowledge of the dynastic considerations which have operated so powerfully on the French Dockyards, in writing or speaking of our Dockyards very often set much the same value on them for defence as the French do on theirs. Indeed, some of them have gone so far as to leave it to be inferred that any amount of money might be beneficially expended on our Dockyards for the military stand points that they, so to speak, afford. Precisely the same argument would justify the creation of a military stand point on Clapham-common or anywhere else; for the fallacy would be identical of still leaving the really vital parts of the kingdom perfectly exposed. The vital parts of course are Liverpool,

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already provided before the conversion commenced; adding to this 10 per cent. for general charges, as a private builder would do, the cost of the *Royal Oak* for *building* amounts to about one hundred and sixty-eight thousand pounds, subject to any corrections arising from the auditing the accounts when they are completed.

The time required to build the iron ship by contract has been twenty-five months (in the case of the *Hector*).

To build the wooden ship leisurely and to the best advantage would take about as long; but if as much pressed as the contractors have been for the *Hector*, and if the workmen were entirely uninterrupted, the period might be shortened to twenty-one months.

ROB. SPENCER ROBINSON.

Glasgow, Newcastle, Leith, &c. It would be a happy riddance for the country, that of military *doctrinaires*, the one-idea or inveterate hobby men, not sufficiently well informed or acute to comprehend the full drift of what they say. If, in support of English Dockyards, no better use than the military one can be adduced, the truth is that we would be better off without them, because then the true stand point of our defence, the navy, would be more perfectly acknowledged. No enemy is ever likely to run his head against English stone walls, unless there is some great and not very dubious advantage to be gained; and as mere works cover no more than the range of their cannon, while ships of war are moveable works of defence as well as of attack, it follows that one of the latter may in the course of a very brief campaign do the work of fifty of the former.

The present object of the French Dockyards.

The present object of the French Dockyards is dynastic in a different sense from the other. The latter was dynastic as against domestic enemies; the former are so as against foreign enemies. What the France of the time aims at in its Dockyards is something that will prevent the country ever going to the wall again as at the close of the long war. The French Dockyards now breathe indifference to the world, either for attack by sea or land, a state of things more suggestive of the offensive, than of the defensive, of years gone by. France, as a naval power, intends at least to keep its enemy on the alert, and by so doing hopes in any contingency to escape the humiliation and change which were before experienced. In a word, happen what may, the Emperor trusts to remain securely seated, because, if in the chapter of accidents success should not attend him, fortune on the other side would not be pushed so far as to be overwhelming.

Gigantic and ready capabilities.

The capabilities of the modern French Dockyards are gigantic and ready. On occasions of gravity every skilled and unskilled workman connected with shipbuilding over the length and breadth of France, may be drafted into the Dockyard service at a moment's notice; and, in the most profound state of peace, the Dockyards would not be taken by surprise, or at a disadvantage, with the influx. In the course of a single night long-closed doors might be opened, rows of cold blacksmith's hearths lighted, vacant benches occupied, and lathes and other tools set in motion. If it should be thought in England that no great dependence is to be placed in the skill of workmen netted in in such a manner, it will be because it is not known what France is doing to render its mechanics the most skilled in Europe. The facts are these:—In France any young man of sixteen years who chooses may, whatever his condition, pass a simple examination in history, geography, spelling, and arithmetic—those are the subjects—and if he gets the highest number of marks he is admitted free into the *Ecole des arts et metiers* at Chalons, Aix, or Angers. If he gets the second number of marks the department in which he lives pays £10 a year for him, and his parents another £10, the remaining half. All below the second highest number of marks, irrespective of the numbers gained, they merely passing a fair examination, are admissible on their parents paying £20 a year. Once admitted into the school the pupils receive board, lodging, and uniform, in addition to instruction in drawing and mathematics. Then comes the choice of a trade, which may be that of an engine-fitter, smith, model-maker, or carpenter; and, after the choice, the day is divided between work in the shop and drawing and mathematics in the school. At the end of three years the pupils are theoretically and practically acquainted with their trade to an extent that would put most English workmen to the blush, and the private workshops of France are then open to them as workmen at three to 3·50 francs a day; or as drawing-office assistants, at £4 to £5 a month. Out of these schools the best practical engineers and shipbuilders of France have come, and one of the members of the eminent engineering firm of Mazeline and Co., of Havre, will, it is to be hoped, excuse this reference to his name. He began the world as an humble pupil in the *Ecole des arts et metiers*, was afterwards received in the ordinary way into Mazeline's employment, and has since advanced, by the force of genius, not merely to the position of partner in the firm, but to that of one of the first mechanical engineers of France. Such are the workmen for the reception of whom the French Dockyards are prepared. No candid Englishman can for a moment doubt that such workmen may be safely trusted with the refit of a disabled fleet in a time of war. Most people will rather be inclined to think that such workmen will do their work as well, if not better, and as expeditiously, if not more expeditiously, than our own.

Warlike Administration.

Then, what shall be said of the administration of the French Dockyards? What is well known need hardly be repeated, that the Minister of Marine, acting with the concurrence, or under the general orders of the Emperor, wields undivided and undisputed power. What is not known is that each Dockyard is as absolutely in the hands of the Admiral-Commanding as the Dockyards and navy are in the hands of the Minister of Marine. The Admirals-Commanding receive the orders of the Minister of Marine, but as they enjoy the confidence of the Emperor—rotation or length of service, not imposing on the public, or deceiving any one—they possess a large measure of initiative power. The Dockyards are made over to them, not as jobbing places, nor as provisions for dependents, but solely for the purpose of raising the French Navy to the highest possible efficiency. In fine, the Admirals-Commanding are not ornaments, nor mere officers, but resident, responsible Ministers, always present to give effect to superior orders and to enforce their own. This obviously is an administrative system that keeps France constantly in fighting trim, with its coat off, ready to fall foul of any neighbour; ready to quarrel with England in the afternoon and make a hostile demonstration on our coasts next morning.

Administration as regards ships.

Further light is cast on the French system by the systematic and thorough readiness in which all the serviceable ships of war are kept. The rule is that first division reserve ships shall be ready to proceed to sea in three days, second division ships in fourteen days, and third division ships in twenty-one days. In other words, every effective ship in the French navy is at all times available in three weeks; exceptional cases of reconstruction or repair alone omitted. The ships here spoken of, be it observed, are reserve ships, not the ships that are lying in the roads, with powder and shot on board and pennants flying, nor the ships that are cruising on foreign stations. With no more than three weeks' notice, the whole fleet, active and reserve, admits of being set in motion. To the application of this rule, as regards Toulon, Admiral Bouet Villaumez recently bore testimony to the Minister of Marine.

Administration as regards seamen.

Still, it may be said, France may be doing all this, but where are its sailors? The sailors will be forthcoming. Often has it been charged against the Admiralty that they were building ships beyond the possibility of obtaining sailors; and the allegation was not devoid of truth, as experience proved in the manning of the Baltic fleet. But, however the case may now be as regards ourselves, there is no such apprehension with regard to the French ships in France. All the effective French ships admit of being manned, and, what is scarcely of less importance, to the last ship on the *Navy List*, they may be manned as soon as brought forward for commission. During the present year almost 200,000 men have been enrolled in the conscription maritime, against 139,000 in 1850, and 124,000 in 1845. And what is done with those men? One and all of them suffer a minimum of three years' compulsory service in the navy, unless in the few cases of buying off, in the same manner and on the same terms as from the conscription for the army. The price is 3,000 francs, or £120. In the navy the conscripts are employed in a manner that may well lead Englishmen to bethink themselves. Three distinct sets of duties are before them, and in each they are in the end deemed proficients. First they become sailors. Next they become soldiers, veritable soldiers with rifle and bayonet, so as to act with soldiers in the field as the marine brigade. In the third place they become gunners. Then it is an understood thing—indeed, there is the precedent of the Crimean war—that in an emergency a twenty, thirty, or as many thousands of artillerymen as may be necessary, shall be transformed into marines and sent on board the fleet by a mere scratch of the official pen. Thus France is as mindful of sailors as of ships. Nay more, France is bent on possessing the best trained seamen that the world has ever known. It at least is not to be behind England, and if possible it is to be ahead. Still, it will be urged that many of the conscripts have never been at sea, and many of those who have must now be rusty. These are sheer delusions. Those, too, who urge them are in the main ignorant of the fact that while France is training, organising, and keeping together its seamen, we are scattering ours. Many a British ship now-a-days has a crew in which there are only one or two in both watches who know the ropes or can steer. Most of the sailors now-a-days on board British ships are aliens and bravadoes. In France it is otherwise. The French marine, such as it is, is a State nursery for the navy, and a merchant seaman deserting from his ship incurs the penalty of court martial, with the mitigated sentence of compulsory service in the fleet during a term of years, all the time on half pay, which barely covers the usual stoppages. When the interests of the British sailor were ignored by Parliament, the law of apprenticeship and the restrictions as to foreigners abolished, people had come to think that wars would not desolate the earth again. As wars, however, have since arisen, and moreover in the presence of what France is doing, it would, perhaps, be the part of wisdom to reconsider what Parliament has done, not as regards the shipowner, but as regards the horny-handed sailor, who, whatever his condition now may be, was once the pride and the best defence of England.

The opinions of the Emperor.

But manifest as the end is at which France is striving, let us hear the Emperor on the subject—the civilian of years gone by, but that does not matter. He says, in reproducing the sentiments of his uncle, in *Des Idées Napoléoniennes*, "Let England have what number she pleases of ships and troops, let her give to her commerce whatever direction it may suit her to give to it, but we shall not fail to assert the same rights." Again, "The period of the Empire was one of deadly struggle between England and France. England triumphed; but, thanks to the creative genius of Napoleon, France, though conquered, lost, materially speaking, less than England." Then mark the following, "Discouraged by the defeat of La Hogue and the events of the war of 1758, on both occasions the navy was abandoned. All constructions were suspended, and the resources of the State applied to the land army and the other departments. The consequences of the abandonment were most fatal to the glory and prosperity of France." These, although not the utterances of to-day, are nevertheless the echoes of to-day. The proof is within a few days' journeying by any doubter. Any doubter taking passage by boat from Havre to Cherbourg will see enough to convince him without troubling himself about an order for admission. Any doubter strolling about Brest, Lorient, Rochfort, or Toulon without authority will do the same. France strains its energies, and so far successfully, to gain a complete mastery over England on England's own element; and not only that, but for holding its own besides against England allied with the other Powers of Europe. Still, some will insist that France is merely carrying out a programme with which the public have been long familiar. Be it so, but England, with its navy meanwhile on a peace, or as regards the reserve, on an absolutely rotten footing, will then have sunk to the political level of a French dependency.

Government support of private industry.

One word more, and then it will be well to turn briefly to the English side of the question of the French Dockyards. The French Government, to use a common phrase, is just now, and for some time past has been, moving heaven and earth to develop private shipbuilding and engine-building industry in France. For this there has been the double motive of creating a great national resource and of obviating the necessity of encumbering the Dockyards with machinery and tools. Of the tool and machinery question the broad view has been taken that it is enough if the tools and machinery exist in France, and that it would be preposterous for the Government to enter into a manufacturing competition in which it would be sure to fail. And it has been warned by the establishment at Indret, in which all the engines were to be manufactured for the navy. Indret is a failure. Like Woolwich it was too unwieldy to produce anything at a fair price, or even at a price that could readily be ascertained, and what was scarcely less serious, the workmanship was inferior. Indret engines were always breaking down, and so serious sometimes were the breakdowns, that eventually neither the Minister of Marine nor the service could trust in them. Indret, therefore, ceased to make engines, and for a time the Clyde, the Mersey, and the Thames were resorted to. An easy effort, however, carried the Minister of Marine through the difficulty. He had only to look to private enterprise in France, and it has been said of M. Mazeline of Havre that when favoured with the first Imperial order he publicly took the novel course of at once dispensing with the services of English workmen. Now, in M. Mazeline's establishment at Havre, France possesses one of the best engine shops in Europe. Two more are situated on the Gulf of Lyons, which are not much inferior. Then, as to shipyards, there is M. Gouin's, at Nantes, M. Armand's, at Bordeaux, and the one of La Seyne Company at the head of Toulon harbour; all yards turning out the largest class of iron-clads. The Havre establishment of M. Normand is also quite as capable. By intelligent Government support of private industry, most cordial assistance towards the improvement of harbours and the construction of docks, the naval resources of France within the past few years have been more than doubled.

The gun and ship question.*

Turning now to the English side of the present objects of the French Dockyards, let us glance at the gun and ship question. How-

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* The following facts on this great question need no apology:—

Heavy Ordnance—France.—While France is in a condition to give us a sound thrashing at any moment, it is remarkable that for some weeks past French negotiations have been in progress for the construction of a large number of heavy guns in this country. By this means France hopes to continue able to thrash us. The guns wanted are 300-pounders for fortifications, and eventually, no doubt, for ships, if proper mechanical means are devised for mounting them. The serious as well as absurd aspect of the matter is that, should France close with the only makers of large guns in this country—there being only one firm in which anything like reliance is to be placed—it will then practically be impossible for the British Government to get its wants supplied until the French contract is completed.

England.—No system finally adopted. At present there is little choice. The great difficulty is, to obtain the requisite strength of construction. The method of rifling and loading are subordinate. The English Government have for the present abandoned all effort to obtain heavy breech-loading ordnance: nor have they as yet tried any system of rifling in monster guns, except the shunt system of Sir W. Armstrong. A number of 7-inch guns constructed alike on the Armstrong plan, and rifled in six or seven various manners, are to be tried very shortly at Shoeburyness. The shunt system is, ever mysterious this question may be to mere outsiders, it becomes simple enough to those in the habit of following the Ordnance Select Committee in a Southend fly to Shoebury.

Nevertheless, the great mass of experimental facts

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however, satisfactory, and has been tried in all sorts of guns—from the 3-inch to the 13-inch calibre;—and for the last five years (since 1859) without eliciting any defect. It is formally adopted by Russia, and the French and Italian systems of rifling have been recently modified in accordance with its principle. We cannot, therefore, be far wrong as to the principle of rifling. The only serious rival to the shunt system is the polygonal system of Mr. Whitworth, but that system has never been tried in very large guns, and its partisans admit that it necessitates a peculiar construction and a peculiar metal, which is as yet altogether untried in heavy guns, and is most difficult to obtain. Mr. Whitworth has found so much difficulty, and has incurred such serious delay in procuring suitable metal for his three polygonally-rifled 5-inch guns recently supplied to the Government, that it would be idle to anticipate any speedy success in the production by him of heavy guns of 8 or 12 inches calibre. It is difficult to conceive any special advantage in the polygonal mode of rifling which can compensate for the extra difficulty confessedly imposed by it in the attainment of an adequately strong heavy gun. The difficulties of construction are, in fact, too serious to be increased by any unnecessary difficulties of rifling. It is noticeable that though the English public are so sensitive on the question of Mr. Whitworth's rifling, yet, in considering the rifled ordnance of foreign Powers they are more reasonable, and only care to know of what power and calibre the foreign weapon is, without being curious as to its mode of rifling. No one attaches any great importance to the difference in the rifling of the French, Italian, Spanish, Brooke, Parrot, or other guns. In common with all foreign Powers we are now concerned in procuring simply strong guns, and on this point there is, as above stated, little choice. Whatever may be the defects of Sir W. Armstrong's system, it certainly produces a strong gun. The report of the Parliamentary Committee on Ordnance of July last (1863) is conclusive on that point. The committee, after hearing Mr. Whitworth and Captain Blakely's evidence as to the construction of guns, unanimously reported to the House, "Your committee have hadno practical evidence before them that even at this moment any system of constructing ordnance exists which can be compared to that of Sir W. Armstrong." (*Vide* Report 1863, p. iv.) "Out of 3,000 guns," the committee added, adopting Sir W. Armstrong's words, "not one had burst explosively." (*Ibid.*) In fact, the Blue Book contains a vast quantity of details which go to show very clearly that the committee could come to no other conclusion, and that the public have been very considerably hoaxed by the rumours of failures of Armstrong guns at home and abroad. However this may be, our Government, while keeping the door open to any future changes, have at present committed themselves to a considerable extent to the Armstrong 300-pr. shunt gun. Ten of these guns are ordered for the *Bellerophon*, and four each for the *Minotaur*, *Northumberland*, *Agincourt*, and other ships. The *Royal Sovereign* is also armed with the 300-pr., and others have been demanded for the Spithead Forts. We hear nothing of any further 600-prs. We are not likely to need many such guns until the Spithead Forts are more advanced than at present.

AMERICA.—The prevailing impression in England seems to be that in cannon, as in other matters, America eclipses us when it comes to mere size. No doubt bigger guns have been made in America than elsewhere—but the big guns are smooth bores. Their largest gun is the 50-ton 20-inch gun recently cast, and designed to carry a charge of 100 lb. of powder, with a round shot. Besides this, the Northern States which, during two or three years, has been accumulated, is still in a crude, undigested state. No one has yet ventured to say positively what should or should not be done. Let us attempt to break ground. At the outset of the iron-plate discovery ships sheathed with 4½-inch

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have a supply of 15-inch 20-ton smooth bore cast iron guns of the same character, carrying a charge of 50 lb. of powder. Though the guns are big, the charges are, to our ideas, out of all proportion small. In this country we have fired 90 lb. of powder from a gun of 11¼ tons weight (the Armstrong 300-pr.); and our 600-pr., which has been repeatedly fired with 90 lb. charges and round shot, weighs but 22 tons. A gun of 25 tons is with us reasonably considered to reach the limit of weight at present manageable. It is reserved for America to regard weight so lightly as to produce a gun weighing 50 tons, and yet of hardly greater power as a smooth bore than our 22-ton gun, which can besides throw rifled projectiles. As to rifled guns the Northern States have a considerable number of Parrot guns. These are nothing more or less than the hooped wrought iron gun with which all Europe is familiar. The coil system of construction has enabled this country to disregard so unsatisfactory a half-measure as that of strengthening cast iron guns with hoops. But in America (both in the North and in the South), as in France, Italy, and Spain, guns have been hooped in the hope of thus enabling them to stand the increased strain due to an elongated rifled projectile. The Parrot gun in the North, and the Brooke gun in the South, are, in their main features, identical. The chief interest attaching to the American guns is that they have been actually tried—but few are aware of the results. We are in a position, however, to state that of the twenty-six Parrot guns (100-prs., 200-prs., and 300-prs.) used against Fort Sumter, sixteen burst after a small endurance with charges of about one-tenth, and that so far from these guns being relied on by the Americans themselves, the truth is that they were never fired except when the gun detachments were safe under cover, and hence the majority burst without causing more than a few casualties. The Confederates are said to be satisfied with the Brooke gun, but we are disposed to think that the steel shot used with these guns deserve more than half the credit of the Confederate gunnery performances. The Confederates have also had two Blakely guns of large calibre, but one of these burst at the first round, and the other has never yet been fired against the enemy.

RUSSIA.—The Russian Government have in matters of ordnance taken two clear and decisive steps. As to rifling they have adopted the shunt system of Sir W. Armstrong. Their secret service in this country provided them with drawings of the shunt plan on its first coming out in 1859. Oddly enough our own secret service in Russia shortly afterwards sent over to us very careful Russian copies of the shunt plan, under the supposition that they were most valuable and original. However, the Russians have only got the crude form of the shunt, and have naturally enough not been able to keep pace with the inventor himself, so that there is a most material difference between the shunt principle as used in England and Russia—a difference seriously against Russia. As to construction, the Russian Government have placed themselves in the hands of Mr. Krupp, of Prussia, who has supplied them with steel blocks for all their rifled field artillery, and who has lately progressed up to an 11-inch gun of 25 tons recently furnished by him. Besides the 11-inch gun, Mr. Krupp has cast and forged a number of 9-inch 12 ton guns, and also more recently one or two 8-inch 8-ton guns. The 11-inch gun is of steel, strengthened with steel hoops. The others are all solid. At present, however, there is no doubt that the Russians are seriously disquieted about their heavy guns. They have selected two or three of the 9-inch guns for continued firing with the service charge, and two of them have burst into fragments. Mr. Krupp's advocates wrought iron, on substantial timber backing, were impenetrable by cast-iron shot or shell. The discovery revolutionised ship of war construction in popular estimation, if not in actual fact, and wood-built ships were considered worthless. The effective navies of England, France, and other countries, were supposed to be the iron-clad ships built and building. We even went so far as to discuss the point with warmth, whether France, in a given year, would possess this or that number. These are the incidents of the first stage of the gun and ship question. Sir William Armstrong, Mr. Whitworth, and others, then came upon the scene. Sir William Armstrong's 32-pounder, fired at 35 degrees of elevation, with a 6lb. charge, attained a range of 9,175 yards, and Mr. Whitworth's 3-pounder, fired at the same elevation, attained a range of 9,688 yards, or 5½ miles.* Still greater results followed. At 200 yards 12-inch oak and 2-inch armour were penetrated

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maintain that the cause of the explosion was in each instance the jamming of the shot; but, indeed, this is always, in the opinion of the gunmakers, the reason why their guns fail. However, the failure of these expensive steel guns has led the Russians into valuable investigation on the best mode of reducing the initial pressure of the charge in guns without at the same time losing a proportionate amount of initial velocity in the shot. Their scientific officers profess to be able, by the employment of the cake powder as used in America, to reduce the initial strain of the charge at least one-half, and that after allowing for a nominal increase of the charge by one-third. It appears also that the 12-ton 9-inch guns burst with 50 lb. of this cake powder, and after but a small number of rounds. The charge would then be only equal in effective amount to 33 lb. of our powder, and ought to have been equal in strain to only 17 lb. Hence we infer that the steel gun is far from successful. The 11-inch gun has only been fired two or three times, but it has been employed once with a charge of cake powder of 110 lb., equal to about 70 lb. of our powder. The failure of the 9-inch guns has rendered the Russian Government cautious in the trial of their single 11-inch gun. This gun cost them unrifled £7,000; so that they think it is a costly weapon to risk. Our 600-pr. Armstrong gun cost £4,000, and has fired at least twenty rounds with 70 lb. and 600 lb. shot. We, therefore, appear to have a much cheaper as well as a stronger system of constructing guns.

* It is to be observed generally on the question of range at given elevations, that the gun of the lesser superiority would attain a still increased range by a still increased elevation. The gun that has the greater range at the least elevation is the best, on the supposition that its shot or shell would kill people on a plane when the other gun fired over head. Of course at high elevations killing on a plane is not thought of.

by the 12-lb. Whitworth shell; at the same range 9-inch oak and 4-inch armour were penetrated by the 70-lb. Whitworth shell; and, last of all, at 800 yards, the 18-inch teak and 4½-inch armour-plates of the *Warrior* target were penetrated by Whitworth shell. Sir William Armstrong's guns, until recently supposed to be less effective than the Whitworths, have likewise riddled the *Warrior* and other targets with solid shot and shell at various ranges, and the light French guns have done the same thing at ranges all the way up to 1,000 yards. The guns, therefore, have at length re-asserted their old supremacy, and from the whole mass of the experiments may now warrantably be deduced the simple axiom that guns will penetrate any thickness of armour-plate that any ship will carry. In other words, an efficiently armed wood ship is practically just as able to destroy an iron-clad as an iron-clad is to destroy a wood ship. The utility of armour-plating, as a matter of course, has therefore vanished, and, willingly or unwillingly, to the acknowledgment of this scientific truth we and all nations must come at last.* No doubt armour plates will keep out the indifferent shot and shell of indifferent guns when such shot and shell would destroy unarmoured ships; but, on the other hand, it is not less true that smart, seaworthy, unarmoured ships may in heavy weather open their ports when even the *Solferino* and *Magenta* would not risk the unloosening of their gun tackles. In a word, we are exactly where we were before iron-clads were thought of, and before long there will be few ineffective service guns—that is, against armour-plates—in the fleets of Europe. Nor is that all. Gun improvement is hardly yet awakened, thanks to the dulness of Admiralty and War-office officials,* and in the future no end of inventions may be in store, while it is well known as a scientific fact that the limit to carrying armour-plates with any degree of stability on the sides of sea-going fighting ships has even now been exceeded.†

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* A conclusion so sweeping may as well be fortified by authoritative testimony.

Sir William Armstrong, in conversation with him on the subject, has stated to the writer that he would as readily engage to mount the guns he makes—on board ship—as to make the guns. The Admiralty, he complains, have never given engineers a chance; never made the mounting of guns on board ship an engineering question. They build ships without the least reference to the guns, instead of building ships to suit the guns.

In Cherbourg, on board the French iron-clads, the writer found the opinion expressed in the text very prevalent. The captain of the *Normandie* in particular expressed himself very warmly on the subject. The opinion generally prevailing was that the guns of the French iron-clads, as they are, are capable of destroying the French iron-clads or any other iron-clads.

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* All the great ironworks of the country might, up to a certain point, become gun factories if any encouragement were held out, but as long as the Duke of Somerset and Admiral Frederick are numbered among gun inventors or improvers the expectation is entirely hopeless. The Mersey Ironworks, Liverpool, have struggled long and ineffectually against the official *doctrinaires.*

† This observation applies to the *Minotaur* class of ships particularly, not to the Chalmers target, the *Bellerophon* or the *Lord Warden*, the weights of all of which are so preposterous that in half a gale of wind the *Alabama*, with a couple of good guns on board, would be a match for all the three, assuming a ship to be built according to the Chalmers target weight, as in the other cases.

The following is a transcript of the official programme of the firing at the *Bellerophon* target. The official programme of the *Lord Warden* will appear elsewhere; at least that is to be hoped, the firing having as usual been postponed. With even the moderate gun ordeal through which the *Bellerophon* target passed, the ship would in half an hour be rendered quite unserviceable.

SPECIAL COMMITTEE ON IRON AND ORDNANCE SELECT COMMITTEE.

*Trial of the "Bellerophon" target, constructed at the Millwall Iron Works, by order of the Lords Commissioners of the Admiralty.*

The Target (20′ 9″ long × 8′ 6″ high) is composed of rolled armour plates 6″ thick, backed by 10″ of teak, and two ¾″ plates for skin. Two external longitudinal stringers are wrought behind each armour plate, through the whole length of the target. The two behind the lower plate are formed of angle iron 10 × 3½ × ½, and those behind the upper plate of angle iron 9½ × 3½ × ½. Frames 2′ apart. The bolts in the lower plate are 2¾″ diameter, and those in the upper 2½″, and have conical heads. The 2¾″ bolts are double nutted, and the 2⅛″ single nutted.

RANGE.—200 YARDS.

*Upper Plate.*

Round No. 1.—68-pr. smooth bore gun, 16 lb. charge, solid cast-iron shot, 66½ lb. weight; cease firing.

The large stock of English ships of war.

It will, no doubt, surprise many to be told that we have an excess rather than a short supply of ships, and that a judicious use of the ships we have would probably carry us triumphantly through any crisis, and against any possible European

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Round No. 2.—110-pr. Armstrong rifled gun, 16 lb. charge, 66½ lbs. solid shot; cease firing.

Round No. 3.—Salvo of two 68-pr. and three 110-pr. Armstrong guns, 16 lb. charges, 66½ lb. solid cast-iron shot; cease firing.

*Lower Plate.*

Round No. 1.—68-pr. smooth bore gun, 16 lb. charge, solid cast-iron shot, 66½ lb. weight; cease firing.

Round No. 2.—5½-inch muzzle-loading Whitworth rifled gun, 12 lb. charge, steel shell, 70 lb. weight, bursting charge 2 lb. 6 oz.; cease firing.

Round No. 3.—7·1-inch muzzle-loading gun, of Ordnance Select Committee, 16 lb. charge, steel shell, 117 lb. weight, bursting charge 2 lb.

Round No. 4.—7-inch Whitworth gun, 27 lb. charge, homogeneous metal shell, 151 lb. weight, bursting charge 5 lb.; cease firing.

Round No. 5.—10·5-inch Armstrong smooth-bore gun (muzzle-loader), 35 lb. charge, solid cast-iron spherical shot, 150 lb. weight; cease firing.

Round No. 6.—Ditto; cease firing.

Round No. 7.—Ditto; cease firing.

Round No. 8.—Ditto; cease firing.

Round No. 9.—Ditto; cease firing.

*Round No. 10.—Ditto, rifled, 35 lb. charge, solid cast-iron shot, 300 lb. weight.

A. HARRISON, Capt. R.A., Secretary S.C.I.

Shoeburyness, 8th December, 1863.

* Steel shell for this gun may be required.

Mr. Chalmers gives the following account of his target in the corner of the sectional plan published by him. The newspaper notices appear there also:—

This Target was constructed at Millwall Iron Works, and tested at Shoeburyness on Monday, the 27th April, 1863. Its chief features are, first—the backing to support the armour-plate A, composed of alternate layers of timber planking B, and iron ribs C, bolted together laterally with the bolts D, and attached to the ship's side by the bolt E, seen in sectional plan; second—an intermediate or second armour-plate F, which is attached to the ship by the bolts G, also seen in sectional plan; third—a cushion of timber planking H, between this second armour-plate and the skin of the ship I; fourth, the bolts have a stepped conical neck, and a peculiar square thread, the depth of which is only half of the breadth.

The objects aimed at in these arrangements were to obviate the evils that invariably result from a backing composed of wood only, such as buckling, penetration, &c., and to guard against the equally injurious effects of vibration and distortion, such as the fracturing of the armour-plates, and the destruction of the fastenings and frame of ship, which are inseparably connected with very rigid structures. This plan of construction was intended to disperse over a large area the power or work contained in the projectile at the point of impact, for owing to the great strength of the compound backing B, C, the force would take the direction of the diverging lines K, thus giving about 25 feet area of resistance at the inner line of the ship's frame L.

"We are bound to say that the result of the experiments on Monday showed that Mr. Chalmers had not been over-sanguine in the anticipations he expressed as to the combination. According to a recent Parliamentary return, the strength of the British Navy on the 1st January, 1864, was 975 ships of all classes, but exclusive of a number of harbour hulks not altogether useless. Of this aggregate of 975 ships, 72 are line-of-battle ships mounting from 74 to 121 guns; 42 are ships mounting from 60 to 74 guns; 94 are ships of large capacity, the majority being of the tonnage of line-of-battle ships, but mounting only from 22 to 46 guns; 25 are corvettes mounting 21 guns; and 500 ships of all classes mounting from 4 to 21 guns. Then there were 185 gun-boats, each mounting two Armstrong 7-inch guns, or two of the ordinary 8-inch smooth-bore service guns. This, there is no denying it, is an enormous aggregation. This, there is no denying it, is a force which, skilfully directed, would not only sweep the Channel but the seas. It is, however, not skilfully, but most unskilfully directed, and no further proof is necessary beyond the fact that among naval officers and in Whitehall there is, and always has been, an insatiable desire for ships. In naval society, and in official naval circles we have no "rest and be thankful," but an habitual dread that unless so much money is voted annually by Parliament, and spent, if not dissipated, in the Dockyards, there would be a speedy end of the country as a naval power. Indeed,

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powers of resistance of his target; though exposed for some hours to a very severe battering from guns of all kinds, it withstood the attack better than any target of the same comparative thickness that has yet been tried, not even excepting the first and most famous target of all—that of the *Warrior*."—*Times of 29th April*, 1863.

" The trial of this target must be regarded as a remarkable success. It stood the brunt of the firing throughout better than the *Warrior* target. In the crowning test—the salvo of five great guns, concentrating 466lbs. weight of metal, at a high velocity, against one plate over an area of about two feet square, it carried away the palm. A similar salvo fired at the *Warrior* target, fractured and buckled the plates extensively, and broke or loosened six or seven bolts. * * * * The importance of the *Warrior* target as a standard of resistance has passed away, and the Chalmers target for the present will be the datum from which to estimate the value of future projects."—*Mechanics' Magazine*, 1*st May*, 1863.

one of the latest changes has been the remodelling of the constructor's department and the arrangement of the preliminaries of a school for the encouragement of naval art, that we may be the better able to strike out vigorously in new directions, even although it may be at the risk of doing so in an ill-considered manner. A more mournful state of things cannot be well conceived. For it is absolutely pitiful that in a great country like England, and, let it be added, a commercial country, there is not that administrative ability in the highest places which is to be found in the humblest walks of commerce; no directing head with an aptitude for taking an intelligent view of our naval position and of naval matters, telling us what to do and strive after. A country so greatly in advance of France and all countries in commercial enterprise, the basis of which is skilful calculation and adaptation, to be excelled by France in the commonplace administration of its navy, is, in truth, a scandal.

The diffusion of English ships of war.

The diffusion of our ships of war in the East Indian and China seas, in the North American and West Indian waters, in the Mediterranean, the Pacific, on the coast of Africa, at the Cape, in Australia, and goodness knows where besides, is no doubt one of the disquieting influences that upsets and accounts for the incapability of the official mind. The same return that informs us of the existence of the 975 ships of all classes, and 185 gun-boats, gives the number of ships on each station. On the North American and West Indian stations there are 29 ships and gunboats; in the Mediterranean, the same number; on the coast of Africa, 22 ships, and so on. Practically, out of a total of 300 ships in commission, the handful dignified with the name of the Channel fleet* consisted of seven ships only out of the 300 and upwards in commission. The system of diffusion, therefore, keeps the Admiralty under perpetual pressure for ships, and especially for new ships. The remedy is obvious. Reduce the strength of your fleet on foreign stations, keep more of your ships in the home seas and in the home ports, and the Admiralty will be at their wits' end with an excess of good serviceable ships, while at present, as has been more than once proved in the course of the American war, they cannot provide a single frigate without casting about in all directions. But, it will be said, our foreign influence would be weakened, if not paralysed, were the number of our ships on foreign stations materially reduced. This is a mere assumption, one that is improbable, and, besides that, is at variance with all experience. France, for example, maintains a much less force on foreign stations than we do, and no one dare say that its foreign influence, not in Europe merely, is injuriously affected by the circumstance. Then take the case of the United States, before the outbreak of the present unhappy war. One ship not unfrequently was their representative abroad, in the same waters where probably there was a permanent English squadron of ten or fifteen ships, and yet it is well known that the Americans commanded the utmost security and respect everywhere. But it is improbable that English influence abroad is in the least promoted by displays of force on any other supposition but the one that we are downright Tearems. We certainly bullied the Brazilians the other day, but no sane Englishman signified his approval, and it is well known that the Brazilians will not soon forgive us. True, we have acknowledged no restraint in our dealings and chastisement of Chinese and Japanese, but the result is that any moral influence ever possessed by us among those people has been wholly sacrificed. Indeed, it is the case that everywhere and in all instances influence is always best acquired by forbearance and good offices. The bully of a neighbourhood may be feared, but no good man will have more to do with him than he can help. The influence that he possesses will be of a sort that is not worth possessing. Then it is above all to be remembered that, whatever the mainspring of our foreign policy in years gone by, public opinion has now-a-days stamped with irreversible approval the doctrine of non-intervention in the affairs of other people. True, we helped Turkey against overbearing, avaricious Russia, but we are not likely to be again guilty of the folly when Italy fought its battles unassisted by us, when Poland has been allowed to bleed, and our kinsmen the Danes to contend singlehanded against an unprincipled and unblushing enemy. In a word, the assumption that were we to weaken our naval force on foreign stations our influence would be destroyed is absurd. Whatever at one period may have justified the maintenance of great fleets away from home, these are times when home alone demands attention. In the English Channel, on the Scotch coast, and in the Irish Sea the great bulk of the British ships in commission should be always found; and then, if an opportunity presented itself and it were thought desirable, we might, without any great apprehension of the consequences, ask the French Emperor what his meaning is. We would then assuredly at least see the question of perpetual ship-of-war construction in a new light, and the country participate in the advantages incident to a considerable remission of truly burdensome taxation.

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* When the fleet was waiting for Copenhagen orders, the other day, in the Downs, it comprised no more ships than the *Edgar* 71, *Warrior* 40, *Black Prince* 41, *Hector* 34, *Defence* 16, and *Trinculo* gunboat; six in all, without the *Aurora*.

The obvious means of greatly improving English ships of war.

There is to all practical men an obvious means of greatly improving English ships of war. It is by raising the boiler and engine power to the highest pitch in all cases where that has not been done already. That is to say, let us get the maximum of speed out of all our ships. For this purpose the boilers and engines now in use would generally be available, because the classes of ships are so various, size in each case varying with class, that in the majority of instances a mere transfer of machinery would suffice. To make this important matter perfectly clear to those not familiar with shipping matters, let it be supposed that classes A, B, C, and D have respectively engines of 100, 200, 300, and 400-horse power; and that if class A were to be fitted with the engines of B, B to be fitted with the engines of C, and C to be fitted with the engines of D, greater speed would be obtained, and only one class of engines—namely, those of A, displaced. The displaced engines, that they might not be wholly useless, could be fitted to new ships or sold at auction. This would be a fresh re-construction of the navy, but it would be comparatively inexpensive, and, unlike the re-construction for iron-clads, would be of an enduring character. But it will be objected no doubt by the professional advisers of the Admiralty—the same gentlemen, in some cases, who *advised* the Admiralty that iron ships, and subsequently that iron-clad ships, would not swim—that experience has shown that you may increase the boiler and engine power without obtaining a single knot more of speed.

Admitting the truth of this, it is also true that there are many ships, nay, that all ships built to sail well, will gain more or less in speed by all additions to their engine or boiler power. The objection accordingly falls to the ground, and all ships not admitting of increase of speed by such a change ought as a matter of course to be let alone. But it will still be urged that a change of that character would be very troublesome, would interfere with the regular work of the Dockyards, and might be more costly than would at the first blush appear. These may be good objections at the Admiralty, but with the general public they can have no force. What, however, might be feared is that from the general incompetency of Dockyard officials some good ships would be spoiled. The risk, however, should be incurred. The ships on which so much money has been spent should now profit by all that mechanical skill can bestow upon them. British ships of war of the present day should be as much distinguished for steaming as British ships of war in days gone by were for sailing. The means of doing so are at our command, both in the private engineering shops and in those of the Dockyards. Than speed for ships of war there is no greater requisite. A fast ship may at pleasure overhaul a slow enemy, or get out of the way of one it is prudent to avoid. A fast ship by the side of a slow one may also choose its own fighting distance, and, with superior long range guns, might demolish the slow one without receiving a scratch in return. Than a good home fleet of fast wood or iron ships, armed with good guns, nothing better, in our day at least, is likely to be provided.

The question of manning.

But the adaptation and use of our great stock of ships implies the manning of them,—a question about which very little has been said of late. Not long since it was the question of questions, but now, in some mysterious way or other, we have come to think very lightly of it. We are surely not over-rating the Naval Reserve, for that, as yet, is barely composed of 20,000 men;* and of that number, those on distant voyages would not be available until after their return. If this is what we are doing, the sooner we undeceive ourselves the better, and reflect on the consequences—the immediate, as distinguished from the remote, consequences—of confronting the enormous well-trained reserves of our nearest neighbour. It is also deserving of consideration whether the standard of Naval Reserve efficiency, as well as the standard of Naval Reserve pay, are not both too low. To these noble fellows we pay £6 annually, and all we require of them is four weeks' training, which may be eked out in four separate weeks throughout the year. Why not fix the minimum at £10, augment the service to two months, and render it compulsory to pass a part of that time on board a gunnery ship at sea, outside the limits of the training port. Now is the time to think of these things, and to give effect to changes, if thought deserving.

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* The actual force, as will be seen, is 17,467 men, so recently as the 31st May, 1864. At the beginning of the year the force was 16,949, the comparison thus exhibiting a very trifling six months' increase. At the increased pay and service recommended in the text, the enrolments would probably be doubled. Beyond that point, it is said, —namely, beyond 40,000 men in round numbers—the pay would have to be increased to not less than £15, which probably would lead to another doubling, or to an aggregate enrolment of 80,000 men.

The Registrar-General of Seamen and Shipping states in his report on the Royal Naval Reserve of the 31st of May last that 20,108 applications have been received and 17,467 volunteers enrolled in the undermentioned ports:—

Aberdeen, 571; Aberystwyth, 18; Alloa, 41; Arbroath, 42; Ardrossan, 33; Arundel, 2; Banff, 26; Barnstaple, 13; Belfast, 61; Berwick, 42; Bideford, 26; Blyth, 76; Borrowstoness, 18; Boston, 3; Bridgwater, 192; Bridport, 23; Bristol, 930; Beaumaris, 6; Caernarvon, 101; Cardiff, 100; Colchester, 7; Cork, 163; Cowes, 1; Carlisle, 3; Cardigan, 10; Dartmouth, 230; Deal, 3; Douglas, 36; Dublin, 95; Dumfries, 2; Dundee, 885; Dundalk, 1; Exeter, 169; Falmouth, 71; Faversham, 29; Fleetwood, 25; Fowey, 164; Galway, 24; Glasgow, 288; Gloucester, 1; Grangemouth, 4; Greenock, 119; Guernsey, 1; Hartlepool, 654; Harwich, 17; Hull, 175; Inverness, 54; Ipswich, 7; Kirkwall, 2; Leith, 90; Lerwick, 194; Limerick, 20; Liverpool, 1,418; Llanelly, 29; London, 4,092; Londonderry, 2; Lowestoft, 19; Lyme, 17; Lynn, 42; Maldon, 9; Maryport, 126; Middlesborough, 7; Milford, 31; Montrose, 68; Newcastle, 237; Newhaven, 23; Newport, 6; Newry, 4; Padstow, 4; Penzance, 74; Perth, 7; Peterhead, 183; Plymouth, 337; Portsmouth, 67; Poole, 78; Ramsay, 3; Ramsgate, 8; Rochester, 15; Rye, 21; Runcorn, 6; Scarborough, 33; Seaham, 482; Shields (North), 1,521; Shields (South), 423; Shoreham, 4; Sligo, 3; Southampton, 274; Stranraer, 3; Sunderland, 1,379; Swansea, 174; Teignmouth, 20; Tralee, 2; Waterford, 13; Wells, 2; Wexford, 47; Weymouth, 33; Whitehaven, 137; Wick, 1; Wisbeach, 2; Workington, 12; Woodbridge, 2; Yarmouth, 99;—total, 17,467.

Of the above, 47 possess certificates of competency as masters, 602 certificates of competency as mates, 19 certificates of service as masters, and 54 certificates of service as mates. The force also includes 2,625 petty officers in the merchant service.

The necessary conciliation of merchant captains.

Into the question of manning, the conciliation of the merchant captains enters to an extent which is little known. Indeed, it may with truth be said, that the captains of merchant ships influence, and will always influence, the sentiments of those serving under them for better or worse, as regards the navy. The truth of this is well known to all acquainted with merchant shipping. For whereas, before the recent origin of the Naval Reserve, it was the custom to ridicule seamen who had ever served in the navy; and, as a consequence, all merchant seamen shunned the navy. In those days the navy was regarded as a refuge for delinquent merchant seamen, just as the army at the same time was regarded as the last resource of the profligate or the debauchee. Now-a-days, when Volunteers make holiday with rifle and bayonet, there have been hopes raised that the exclusiveness of the ward-room and the quarter-deck would yield, like most other usages, to innovation; and in the merchant service it has therefore ceased to be thought criminal to have served the Crown. Merchant captains, emulating the Volunteers, have abandoned themselves to patriotic impulses, chiefly, it must be said, by reason of the persuasive rhetoric of the well-known shipping organ. To the *Shipping Gazette* belongs the honour of bridging the chasm of prejudice and dislike which separated in feeling the merchant from the naval service. The hatred of soldier-sailors once abated in the merchant service, merchant sailors afterwards ventured one by one to accept the slender bribe of Parliament; and at the present time there are several hundred mates and captains enrolled, without distinction, among the able seamen. But there are strong symptoms of reaction. The Volunteers of the merchant service have been repelled more rudely than the Volunteers of the office and the shop. To two forms of relief they were entitled, and neither has as yet been accorded them. Captains of first class merchant ships might in all fairness lay claim to the command of first class navy ships, just as civilians have laid claim to the command of regiments. As yet, the only rank accorded—and it has been accorded to very few—is that of lieutenant or sub-lieutenant, which, to say the least, is inadequate. Then there is a peculiar disqualification under which all officers in the merchant service labour—a disqualification so old and barbarous that its continuance to the present day is a reproach and scandal. When a merchant ship meets with a mishap of any kind of a serious character, the commanding-officer is put upon his trial. That, of course, may be right or wrong; indeed, on the whole, it is proper that he should be so. But how is he tried? Not as a naval officer in a like predicament; because the naval officer is arraigned before a proper court, and judged by his peers. The merchant service officer is charged before a stipendiary magistrate, who may be ignorant of seafaring matters, and yet, from the judgment so passed upon him, there is no appeal. No jury determines the fact, and the law is such as the stipendiary magistrate chooses to invoke. The certificate of competency or of service, without which no one can be a merchant officer, may be suspended for a year or absolutely withdrawn. On the bench, beside the stipendiary magistrate, there is to be sure an official designated a nautical assessor of the Board of Trade. Between the two it is decided whether a helm should have been put up or down, whether soundings should have been continued, whether less or greater speed should have been given, or any one of a dozen other things. A jury of merchant officers would satisfy the merchant service. A fair trial and no favour is all that is desired by them; but a barbarous usage is inexorably and cruelly imposed. Not long ago an influential deputation had an interview at the Board of Trade; but the tyranny remains. One class of her Majesty's subjects continue under legal disabilities which are a scandal to the times in which we live.[*]

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[*] On the occasion of the trial of Captain Stone, of the Cunard service, I could not forbear sending the following letter to the newspapers on the subject:—

*To the Editor.*

SIR,—Since the finding of the Liverpool stipendiary magistrate, in the case of Captain Stone, of the Cunard steamer *Africa*, I have taken the trouble to ascertain the feeling of the shipowners, officers, and seamen of the mercantile marine, and particularly the feeling of the officers and seamen of the Naval Reserve. With your permission I shall state what that feeling is, and suggest what I conceive to be the proper means of healing the perilous estrangement that exists between the Naval Reserve and the Admiralty, on the one hand, and between the mercantile marine and the Board of Trade on the other. I grieve to state as a fact that were the country just now to become involved in a naval war it is very doubtful if the seamen and officers of the Naval Reserve would stand forward as at the time of the *Trent* imbroglio, and that it is doubtful if now the great shipowners would proffer their ships as during the Crimean war. The seamen and officers of the Naval Reserve are smarting under deliberate insult from the Admiralty, and the mercantile marine, of which the Reserve are members, are smarting under what they conceive to be the degrading tyranny of the finding of the Liverpool stipendiary magistrate in the case of Captain Stone. Of Captain Stone, I may as well tell you, I know nothing, and as little of the Cunard Company; so that I write from a sense of duty, and on public grounds.

What, then, is implied in the finding of the Liverpool stipendiary magistrate that the

The danger of these disabilities.

The danger of these disabilities is the obvious one, that a feeling more perilous than dislike will take possession of the minds of merchant officers. They are likely to become unpatriotic. Indeed, it is the case that such a feeling has already gained ground, and is gaining ground. Among

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mercantile marine should take it so much to heart? Superficial observers will tell you that had the finding not compromised the captain of a Cunard steamer there would not have been a dissentient voice. There is an appearance of truth in the statement, but it is a mere appearance. The truth lies deeper. It is for the first time felt that a wrong has been done, and that the position of the seamen, officers, and owners of the mercantile marine is less satisfactory and less dignified than that of any other class of the Queen's subjects. This is what occasions the profound indignation which at the present time pervades the mercantile marine. Once at a metropolitan police-court there was a decision of an equally monstrous character, but it only provoked derision, and was at once altered. The metropolitan case was the finding by the stipendiary magistrate that the ship's cargo was loose and rolling about the deck, and therefore that the ship was lost in consequence. "No," it was replied, "the cargo was not loose and rolling about the deck," and the stipendiary magistrate insisting that the fact had been given in evidence, read from his notes that the cook of the ship stated that the harness casks were loose and rolling about the deck. The assessor to the Board of Trade laughed, and everybody laughed, because the harness casks are the beef and pork barrels from which a ship's crew are fed daily, and are not casks containing harness, or any part of a ship's cargo. Such was the metropolitan finding, and it is almost a shame to revive it. The finding of the case of Captain Stone is of the same character. An unprofessional, and therefore incompetent, judge decides, to the best of his judgment no doubt, but decides wrongly. He, no doubt, as a warning to others, suspends Captain Stone's certificate in a case which should not have been brought into court, and which, if brought into court, should have led to Captain Stone's acquittal. Into the merits of the case I shall not now enter.

But more important than the question whether Captain Stone is right or wrong is the grievance, or rather the disqualification, under which the mercantile marine is now felt to suffer. Captain Stone is arraigned before the Liverpool stipendiary and condemned. At the first blush the proceeding is unexceptionably regular and proper. But, going again beneath the surface, the proceeding is improper, irregular, and at variance with all our English notions of law and justice. Were Colonel Crawley tried as Captain Stone has been tried Colonel Crawley would be placed in the dock, and his judge would be a stipendiary magistrate, assisted by a gentleman from the Board of Trade. Nay, more, Colonel Crawley would be questioned and cross-questioned French fashion, by the court, so that if possible he might criminate himself. This is where the shoe is pinching the mercantile marine. This is what is felt as cruel, unmerited degradation. Why should officers commanding British merchant ships be tried according to the old-fashioned French criminal law, and Colonel Crawley and all other Englishmen be tried in a different manner—in a manner that all Englishmen approve? Why should not officers commanding British merchant ships be tried as officers commanding Queen's ships? British merchant officers are taken before an incompetent tribunal, questioned and cross-questioned, and condemned by mere caprice; while naval officers are tried by competent court-martial, and acquitted or condemned in a becoming and rational manner. Unless a remedy is found for the anomaly, and that speedily, I am sure I merely give expression to the sentiments of the officers of the merchant service there are many who, whatever the extremity of the country, would respectfully decline to imperil either life or limb, and might even be expected to laugh at its calamity. Upon them, so they maintain, society has no claim, because by society they are virtually proscribed. Nor are such officers mere malcontents. They are in a position of great influence, and that influence they are of course sure to use to the disadvantage of the public. They will naturally sneer at the reserve seamen among their crew, and make no secret of the grounds of their dislike. Unreconciled by justice, aliens to patriotism, and propagandists under circumstances the most favourable to gaining converts, the fear is that in time the whole mercantile marine will become leavened with the old feeling that kept the

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the seamen and officers of the Naval Reserve, and the seamen, officers, and owners of the mercantile marine, when I state that in a time of extremity they will leave the Admiralty and the advisers of the Crown to do the best they can for defence. When the mercantile marine is raised from its present cruel, unmerited degradation it will be found animated by the same patriotic spirit as during the *Trent* imbroglio, but not before. Before the British mercantile marine will now defend their country their rights as Englishmen must be first recognised.

It is painful to state this necessary conclusion, but as it is the truth it should be stated. What then is to be done? The remedy is obvious and simple. When an officer of the British mercantile marine is tried for the damage or loss of his ship let him be judged, not by a stipendiary magistrate assisted by an assessor from the Board of Trade, but by a jury of his peers. A jury of mercantile marine officers should determine whether right or wrong has been done, whether praise or censure shall be passed, or judgment of acquittal or condemnation passed. This would be a simple and I believe a perfect remedy, and I, for one, think that it would conduce greatly to prudence at sea, and to the professional elevation of the officers of the mercantile marine.

Did I not fear that I have already trespassed too much on your valuable space, I would enter at some length into the existing unfortunate understanding between the Admiralty and the seamen and officers of the Naval Reserve. Suffice it to state that just now no dependence is to be placed on that fine body of men, and that, apart from the case of Captain Stone, until the Admiralty consent to allow the men of the Naval Reserve to be commanded by their own officers, not another officer or seaman worth having is likely to be enrolled. Four hundred merchant officers tendered their services to the Admiralty on these terms, and three months afterwards they were "honoured" with a reply declining their services. On no other terms, the Admiralty may rest assured, will the officers of the mercantile marine, at any time, whatever the extremity, seek to defend us by their skill and valour.

London, November 27. P. BARRY.

merchant service and the navy hopelessly apart. No doubt the slender bribe of Parliament is convenient to many, and to a great number the navy has lost all the terrors that previously invested it, but it is equally true that the present exclusiveness and proscription are un-English, unwise, and extremely perilous. It is a system of trifling and estrangement directed against a body of men who are invaluable at all times, and without whom we could not possibly contend in any great war against our enemies. And it will be conceded by all that our sailors merit better treatment, for more generous and gallant fellows do not breathe. Were they to receive their deserts the Government would constantly be erring on the side of conciliation rather than on that of enmity and repulsion.

The good results of different treatment.

The good results of different treatment would be incalculable. We possess a great—nay, the greatest—maritime population, and that population well affected towards the Government, it would be an easy task to organise a reserve sufficient not merely for all probable but for all possible contingencies. Things might be so ordered that the moment the word was given every ready British ship of war would be manned by a fighting crew. Such a state of preparation would obviously strengthen our diplomacy throughout the world, and greatly diminish the risk of war. It would also give new and complete assurance to the timid, for at every point our coast would practically be invulnerable, without so much as a single fort.

## CHAPTER II.

## CHERBOURG.

An artificial Dockyard.*

Cherbourg, the first French port of war, and the fourth French construction port, possesses an artificial dockyard—a circumstance which shows what may be done, not only as regards dockyards but also as regards harbours, in those cases where nature has done little more than trace the outline and furnish an abundant supply of water. On the bare headland to the west there was presented a superb position for defence, and to the south and east not only the same inducement, but fine coast indentations, with on the extreme east an outlying island on the line of the headland. A breakwater had therefore merely to be formed between the island and the headland to constitute a stronghold of great capacity, which would be also safe for shipping against every wind. So reasoned Frenchmen long ago. But the task was a great one. It was analogous to surveying the entrance of the

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* Portsmouth Dockyard is the English dockyard to which it has been said Cherbourg is opposed. It is at least the nearest dockyard to Cherbourg. In comparison with Cherbourg it is contemptible, Cherbourg being a modern dockyard, and Portsmouth one of the knee-breeches and shoe-buckle period. Its burning down at any time would be an easy task, although fortified to the full extent proposed, because fortifications, to be of any practical value now-a-days, must be at least ten times more formidable than the British public will ever sanction. It may therefore be justly inferred that all the money in course of being spent will be absolutely thrown away, because it will be insufficient. But the burning down of Portsmouth Dockyard would really be more a national benefit than loss, because it stands, and perhaps will always stand, with the other dockyards, in the way of thorough navy reform in this country. Were we absolutely without dockyards we would be stronger than we are, as in such a case it would be extremely difficult to inflict on us a severe blow, our ships of war either keeping the sea or making use of our great commercial harbours. During the short period that Mr. Stansfeld was at the Admiralty he was unwise enough to lend himself to a great Portsmouth extension scheme, a service that Southsea has promptly acknowledged by the erection of "Stansfeld Villas." That extension scheme has since received the sanction of the Select Committee on Dockyards, and eventually, unless a stand is made by Parliament, Portsmouth Dockyard will become a great Millwall Iron

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Works, or Thames Iron Works, in addition to what it is at present. It will be as independent of the general industry of the country in this year of grace 1864 as it was in the time of Henry the Eighth, although Portsmouth was then a good day's journey from the metropolis, and a week or ten days' journey from the iron manufacturing districts. It is to be hoped that common sense will prevail, and that the altered circumstances of the country, together with the ruinous results of all public manufacturing, will exercise their proper influence.

### THE DOCKYARDS.

### *REPORT OF THE SELECT COMMITTEE.*

The following first report from the Select Committee on Dockyards has been issued:—

1. Your committee were instructed, on 25th February, to "inquire into and report upon the basin and dock accommodation of the Royal Dockyards in the United Kingdom, and its sufficiency for the public service, having reference especially to the proposed extension of her Majesty's Dockyard at Portsmouth."

2. By a subsequent order of 20th April, we were directed to extend our inquiries to, and report upon, "the dock and basin accommodation available for the repair of her Majesty's ships when employed on foreign stations."

3. Your committee have hitherto directed their especial attention to the proposed extension of her Majesty's Dockyard at Portsmouth.

4. The present capabilities of the dockyard for repairing and fitting out ships consist of eleven docks (two only of which are of sufficient length and breadth, and one only of sufficient depth, to dock a first-class ship, with her weights on board), and of two basins—one, the ship basin, containing 2 acres 12 roods 30 perches, with a depth of water at ordinary spring tides of 24 feet 6 inches over the entrance; the other, the steam basin, of 7 acres, with 25 feet 6 inches depth of water.

5. The evidence is unanimous that this accommodation is inadequate for the ordinary requirements of the navy, even in time of peace.

6. Various opinions have been given as to the number of additional first-class docks required. Some witnesses consider that four, others that as many as eight are required. The Duke of Somerset thinks that at least three should be constructed. As to the extent of the additional repairing basins required, the evidence goes to show that from 20 to 30 acres are considered necessary; and it is urged by some witnesses that, instead of mooring the ships in ordinary in the harbour, economy and safety would be best secured by placing these ships in a basin devoted to that purpose.

7. The factory establishment is stated to be capable (or nearly so) of effecting the repairs and refitting of the fleet.

8. A site, the property of the Crown, but subject to certain rights of way, comprising about 93 acres, bounded by Fountain Lake, and covered at high water, immediately contiguous to the north end of the dockyard, is stated by unanimous evidence to be an excellent site for the proposed works. The subsoil is said to be of stiff clay, rendering piling foundations unnecessary, and of good quality for making bricks.

9. A large convict establishment being contiguous, your committee are informed that much of the work can be accomplished by convict labour, as in the case in similar works now progressing at Chatham Dockyard.

Thames and assuming that, were a breakwater to be formed from Shoeburyness to Sheerness, one of the greatest and best harbours in the world would be provided, which, by proper defensive works, might be made impregnable. As France was in want of a great dock-

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10. Your committee have thought it right to ascertain whether the water on the bar of Portsmouth harbour can be maintained at a sufficient depth for the largest ships; and they have received conclusive evidence on this important matter, showing that no apprehension need be entertained of future inconvenience.

11. From the foregoing evidence your committee have come to the conclusion—1st, That additional basin and dock accommodation at Portsmouth is required; 2d, That the site recommended is well adapted for the purpose.

12. Your committee have agreed to report at once their opinion upon that branch of their inquiry which relates to Portsmouth Dockyard, in order to enable the Government to bring in a bill to authorise the diversion, stopping up, and appropriation of certain streets, roads, and landing-places, preparatory to the extension of that yard.

13. Your committee are proceeding with the further branches of the inquiry entrusted to them.

In anticipation of the foregoing report, the *Times* published the following paragraph on the subject:—

"PORTSMOUTH DOCKYARD EXTENSION.—A Select Committee having been appointed, with Lord C. Paget as chairman, to take into consideration the basin and dock accommodation of the United Kingdom, an opportunity is thus offered for testing the merits of the plans proposed for the extension and improvement of Portsmouth Dockyard, plans of a more comprehensive character than any which have before been submitted to the consideration of the Admiralty on that or any similar subject. The projector of this great scheme has not only submitted elaborate designs showing what is required for a first-class establishment, but he has also explained fully all the difficulties that beset this important question, and the method by which those difficulties may be surmounted. The works for the extension of Chatham Dockyard, which were designed by the same hand, and are now fast progressing, comprise a large amount of work, but the scheme for the proposed extension and improvement of Portsmouth yard exceeds that of Chatham by far—is, in fact, a larger and more difficult subject to deal with, and, unless the plans and reports are printed in full for the information of the committee, it will be utterly impossible for the members to comprehend the subject so clearly as they should in justice to its importance. A condensed plan of the proposed extension, without the reports, has been printed by order of the House of Commons, and this shows the extension in two parts, what is proposed to be done for the present being shown in full red lines, and a portion which is marked as for "possible future extension" being shown in dotted lines. The whole subject is, however, so intimately connected, and has such an important bearing upon the tidal condition of the harbour, that if one part of the scheme is adopted the other is almost certain to follow. The entire design, as shown on the plan referred to, commences at the present steam basin at the north end of the dockyard, and extends thence 4,500 feet in a northerly direction over the narrow water ways and the mud lands of the harbour, including Great and Little Whale Islands. At its widest part the plan is upwards of 3,000 feet in width. The first part of the plan, shown in full red lines, consists of a tidal basin with an area of nineteen acres, and a depth of water of 30 feet at low water spring tides. This basin adjoins the present steam basin and timber ground, and will have a communication with the former through its present north wall. At the head of the basin are shown three docks, each 500 feet in length and of commensurate depth. Next adjoining yard on the Channel, so as to be able to hold its own against the English Channel dockyards, neither difficulty nor expense could stand in the way. Plans of the works were ordered, and the works in time proceeded, with the accompanying drawbacks incident to an engineering and military work, which in reality has no equal. Alderney harbour, Holyhead harbour, Portland harbour, and all other English harbours dwarf into insignificance in comparison with that of Cherbourg, while the defences are scarcely less formidable than those collectively of Gibraltar and Malta. French military and engineering skill have been exhausted, first in the creation of Cherbourg, and afterwards in its defence; and the monument is not less worthy than enduring. Less than fifty years ago cattle grazed on the site of the basins, docks, slips, and shops of Cherbourg Dockyard, and in the course of human events, happen what may, the grass is never likely to grow again.

The sea approaches.

The sea approaches of Cherbourg Dockyard will be witnessed by the traveller in one

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this tidal basin is shown a repairing basin having 30 feet depth of water at high water spring tides, with an area of 22½ acres, in which vessels could lie afloat during the time they are under repair. At the head of this basin are four berths, or slips, for ships, with hydraulic lift and its accompanying engine and valves. In front of these two basins and their docks and repairing slips is a channel, leading from the main channel of the harbour, which will have 30 feet depth of water at low water spring tides. The second part of the plan shown in dotted lines consists of a basin of 62 acres area, containing on its eastern side two docks and four slipways of the largest description, and next to this magnificent basin the plan shows fifty docks or ways for holding vessels high and dry out of the water to a size reaching 3,000 tons. The importance of this latter part of the scheme is obvious when it is considered that, however perfectly an iron ship may have been rigged, stored, and prepared for commission when in the first-class steam reserve, she can never go to sea after being commissioned until she has been placed in dock and had her bottom cleaned and valves examined, and also, in addition to this, the present care of our steam reserves costs some £75,000 per annum, a great portion of which would be saved if the new system were adopted. A wide deep channel is shown past the front of the new works, from the north end of the dockyard to Little Whale Island, communicating between the deep-water channels of Portsmouth main harbour and Porchester Lake.

of two aspects, it being the case at Cherbourg as at most other exposed ports, that the weather is either fair or foul. With a half or whole gale from the north-east or north-west the making or taking of the port, especially at night, is far from easy; and shipwreck among small, and particularly among east of England colliers is not unusual. Not long ago the launch of the iron-armoured *Couronne*, manned by some thirty brave fellows, swamped in a humane attempt to save life, and only one of the number was washed ashore and saved. Inside the breakwater it sometimes happens that no small boat could live, however well the ships may ride at anchor. Over the breakwater the heavier waves surge, and through the passages between the breakwater and the land the sea rages furiously. Paradoxical as it may seem, these storms are numbered in the advantages of Cherbourg, because it is a port that no enemy could or would attack in stormy weather. Of course in fine weather the presumption is that the gun range of its redoubts and forts will not be neared. Entering the port from Havre, when it blows, is the reverse of pleasing, and one cannot fancy that the defences are really formidable. The breakwater is low-lying and unimposing, while the casemated heights to the right and left, and behind the town, appear not only puny, but too remote to prove embarrassing. Then the passages afford sufficient room to enter comfortably, and visions, therefore, of invincible English iron-clads insensibly and determinedly fill the imagination. Too frequently has the strength of Cherbourg been measured by Englishmen in this depreciatory and conceited manner. Yachtsmen, under the genial influence of those creature comforts without which a cruise would be intolerable, are in the main responsible for all impressions of this kind that happen to be abroad. Nay, those gentlemen are even chargeable with detracting propagandism in their more lucid moments, it being an article in every yachtman's creed, as the exhibitions at their annual dinners testify, that on the salt water at least he is a match for any nine tailors, or as many Frenchmen. Rather oddly, French yachtsmen, and now-a-days there are not a few, speak contemptuously of our Spithead and Portsmouth Dockyard, and look forward hopefully to the time when they will assist in our humiliation. But however unimpressive Cherbourg is when entered in a gale, there is no mistaking its importance when the wind is hushed, and inside and outside the breakwater the sea is unbroken by a ripple. Your talking French captain, in his so-and-so steamboat, points gaily to the first dull outline on the horizon. All that your unaccustomed eye recognises, you might, to use an every-day expression, put into your eye. After dinner, however, the scene is changed, for the hour passed pleasantly below has brought you some eight or ten miles nearer. The captain's glass is placed in your hands, and, standing by your side, he guides you from height to height, fort to fort, and redoubt to redoubt, along the whole double line. You cannot help giving expression to your surprise, and, unconsciously, the glass is laid down and the mind becomes wrapped in anxious thought. You are impressed with the conviction that the land redoubts and forts are of themselves strong enough and accessible enough to render the roads untenable by any fleet that might force the passages to the right and left of the breakwater. But the steamboat now nears the Passe de l'Est, the channel between the Ile Pelée and the eastern extremity of the breakwater. Your friend the captain lays his course close in to the breakwater fort, then keeps away towards Fort Imperial or Ile Pelée and Fort des Flamands on the mainland. The sight is one never to be forgotten. Such works are nowhere to be met with on English soil. Tier on tier of casemates rise from the water's edge and bristle with cannon, which you approach near enough to see are of large calibre. Obviously the fire of Fort Imperial crosses that from the breakwater fort, while that from Fort des Flamands crosses fire with a redoubt lower down. Nay, more, Fort des Flamands crosses fire with Fort du Homet and Fort du Galet. Then over those forts the lines of land redoubts have their tiers of guns bristling on the roads. Untold treasure has been spent; untried power has been created, the force of which cannot now be estimated. This alone is certain, that within the breakwater of Cherbourg Dockyard the iron-clad navy of France might be assembled, and from there issue at pleasure against an enemy. Yachtsmen in their cups may laugh at casemates, and trot out that noble animal the British lion, but the logic of conceit and raillery in matters of so much gravity will not, it is to be hoped, impose on many.

The land approaches.* The land approaches of Cherbourg Dockyard, in addition to redoubts and forts, possess features of an interesting kind. Behind Cherbourg there is a country flowing with milk and honey. Normandy, without exception, is the richest agricultural district in all France. Its meadows bear the choicest natural grass, its orchards the choicest fruit, and its barn-yards are stocked as no other French barn-yards, with reputable-looking cattle and flocks of poultry. Nor do its fields present traces of subdivision or neglect. Everywhere a good soil and a fair climate meet with appreciation. Everywhere industry commands the suffrages of a frugal and worthy people, who are as yet comparatively ill-rewarded. As yet the agricultural produce of Normandy does not yield the fair equivalent of the price realised in consuming England, but in these days of freer intercourse and of more genial feeling between nations this cannot long remain the case. Just now the fine butter of Normandy is frequently retailed in London at thrice the cost price in Normandy, although the charges of transportation and agency are merely fractional. But to return. Approaching Cherbourg by the land a rich and thriving country is traversed on every side and over every acre. The country is one that provides in the utmost possible abundance some of the most essential necessaries of modern war. Given a fleet with its armament, stores, and men, Normandy might without inconvenience endure the burden of the rest for ever. It is the Devonshire of France. Overrunning with plenty, it is also remarkable for surface undulations

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* The sea and land defences of Portsmouth recommended by the Defence Commissioners are based on the improbable hypothesis that France will some day or other effect a landing and afterwards conquer and annex us. It would be a mere waste of words combating the delusion. England, we may rest assured, will never be conquered in our day, nor Englishmen be subdued. What is to be feared in a war with France is the taking of the starch out of the Admiralty, the War-office, and the Horse Guards; nothing more. No Englishman would know those establishments after a brush with France, and the present heads of those great departments would be found dividing their time between Baden-Baden and our own domestic watering-places. They would have ceased to be great functionaries, Englishmen being very easily done with in quiet times, but very unreasonable when their blood is warm. The fate, however, of those gentlemen would be merited, for a single stroke of the official pen is alone required just now to bring order out of disorder and efficiency out of inefficiency; but the loaves and fishes of office are too much to be risked for the mere good of the public service.

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The Defence Commissioners recommended the erection of works at Portsmouth for 1,087 guns, or say a fourth of the guns defending Cherbourg, and garrison accommodation in the town and in the Isle of Wight for 20,000 men. At such a rate of appropriation our armies would obviously require to assume the bulk of the Federal armies. We would stand in need of a million of defenders at the least, an absurdity which no doubt escaped the Defence Commissioners in the multiplicity of considerations that oppressed them—among others the consideration and effect of the sack of London on Stock Exchange quotations.

which will always perplex an enemy. An enemy landing near Cherbourg for the purpose of its reduction by siege would have a task before him not offering the faintest hope of success. His every step for miles would be impeded even by a numerically smaller force from behind successive natural field works, which there would be no carrying by assault. In a word Cherbourg is a stronghold as well provided by industry and nature on the landward side as it is by art to seaward. It is a stronghold frowning defiance to the world; it is one of several guarantees to Frenchmen that the humiliation of 1815 will not be repeated. Entering the town by railway a fine view is afforded on the right of Mount du Roule and the great fort surrounding it; and on the left of Fort Basquenne on another eminence. Stepping from the station a fine avenue leads you to the town, and before you sleep the authorities require your landlord to send in your name, nationality, and whence you came. In Cherbourg no stranger can find seclusion.

The town. The town of Cherbourg is another Chatham or Portsmouth as regards filth, depravity, and other things. But, unlike our dockyard towns, it exhibits a fair increase, for while in 1840 the population was not more than 20,000, it is in 1864 42,000. The merchant shipping of the port, from the ship *Ville de Cherbourg* of 713 tons to the *Marie* of three tons, now numbers nearly one hundred and fifty vessels, of all sizes, and as they are chiefly engaged in the country trade considerable mercantile activity prevails. But it is in France as in England, commerce and war do not flourish side by side. The population of all dockyard towns lack the reliance and independence of the population of other towns, being accustomed to subserviency to those in power. In the dockyard town the merchant and shopkeeper have no higher views than those represented by fat contracts; while elsewhere they seek the patronage of all classes. In the dockyard town working men are thankful if in receipt of the pittance of the government, while in the great seats of industry they are aspiring and irrepressibly eager for the amelioration of their condition. So on the whole the town of Cherbourg, notwithstanding its increase of numbers, is pretty much what it might be imagined. A few avenues of the Parisian type give vivacity and a gloss to the exterior parts, while in the town proper the masses are housed in low, ill-lighted, ill-ventilated, undrained, stone and lime shanties. Enter any of these shanties, and you are reminded that misery is not peculiar to your own country. Then reflect on the millions expended on the breakwater, forts, redoubts, dockyard, and arsenal, and you cannot help regretting that so much should have been sacrificed for war, and that so little is available for the well-being and happiness of the great body of the people.

Access to the Dockyard. Access to Cherbourg Dockyard is usually obtained by yachtsmen without much trouble, particularly if their craft is a good one, their larder well found with beef or mutton, and their cellars stocked with Bass's or Allsopp's ale. Then the right hand of fellowship will be extended to them, and a perpetual *entente cordiale* sworn to. Unaccompanied with their craft, or unprovided with the good things of the present life, yachtsmen must take their chance with other people. And the mere chance of getting inside Cherbourg or any other French Dockyard should never tempt an Englishman to make the trial. Three sets of influences, operating separately or together, may bar the entrance, so that there are always three to one against admission. In the first place the British consul at the port may be a German or a fool. If the first, he is almost sure to be hated or despised by the Prefect Maritime, so that no favour need be asked; and if the second, as he is likely to have committed himself in some way or other, he is useless. A British consul, without the privilege of visiting a French Dockyard himself, is obviously the last person to apply to for the purpose of getting the privilege to another. In the second place, the Prefect Maritime may be a crotchetty old fellow, like some of our own admirals. In that case he may lay down the broad rule that no alien is to gain admission unless by superior order; he may even go so far as to insist that the superior order shall receive a literal interpretation only—insisting that an order for admission is amply satisfied by what practically amounts to bowing the visitor inside the dockyard gates and immediately afterwards bowing him outside again. In the third place, the Minister of Marine may at any time send instructions to any one of the dockyards, when there is anything secret going on, to admit no one. So getting into a French dockyard, that is, getting into it thoroughly, is no easy matter, as the officers of the *St. George* found at Brest when they desired to accompany Prince Alfred, and as the naval *attaché* at the British Embassy in Paris found last summer when he visited Toulon. The writer being duly authorised by the Minister of Marine experienced no difficulty at Cherbourg, but, on the contrary, was courteously received, and accompanied at pleasure by a *gendarme*.

The general plan of the Dockyard.

Passing the drawbridge and the entrance gateway the appearance of the dockyard is striking. Not that the area so greatly surpasses that of Portsmouth, or rather of Devonport and Keyham, but that the effect is French, and therefore novel. Cherbourg Dockyard is not a jumble of old and new buildings on the plan of a town that is half ancient and half modern, the new houses being erected without the least regard to present order or uniformity, but it is a modern dockyard, a bran new one, and in reality the best existing specimen of what a dockyard ought to be. You pause on the threshold and express to the *gendarme* your unreserved and heartfelt admiration. He, happy on his part to meet with a generous John Bull, at once takes to you, and you and he are instantly on the same footing as if you had been known for years. It is desirable to present the reader with a clear impression of the general plan of Cherbourg Dockyard, but it is impossible to hit on any one comparison that will be universally intelligible. The mouth of the river Thames is perhaps best known to the masses in these days of travel, and as it has been alluded to before, that is a good reason for its being used again. Take, then, the mouth of the river Thames to illustrate the general plan of Cherbourg Dockyard. A great breakwater occupies the middle of the river; between its extremity towards Sheerness and the land there is an island, and between its extremity towards Shoeburyness and the land there is another island. The passages at the Shoeburyness side between the land and the island and between the island and the breakwater are more difficult and better armed than the passages on the Sheerness side, because the dockyard has been formed on the Shoeburyness side; formed exactly where Southend pier stretches into deep water. The south-end pier of Cherbourg Dockyard is a promontory of solid rock of considerable elevation, surmounted by the truly formidable casemates of Fort du Homet. Upon that promontory the north end of the dockyard rests, and, looking landwards from Fort du Homet, the ground-plan of the dockyard is an irregular parallelogram. A line drawn from the extremity of Fort du Homet gives the front and entrance to the dockyard, and a line drawn from the point where the promontory springs from the mainland gives the rear of the dockyard. Then, last, the short south end of the dockyard faces Fort du Homet and skirts the north-west corner of the town. It is a well-considered plan. Assume Southend pier to be a high promontory of rock, surmounted by a fort of the first class, and that promontory to form the outer narrow end of Cherbourg harbour; the inner narrow end to be at Leigh; the long back length along the cliffs at Cliff Town; and the long front length on the river partly facing Sheerness and partly facing the great defensive works which block the entrance to the river. The ground-plan of the dockyard, therefore, apart altogether from the defences, is an irregular parallelogram; the length being as near as possible thrice the breadth. The outer or Southend pier end is where the great bulk of the incombustibles are stored, because it is just possible that some day or other a dashing enemy will force the Shoeburyness passage and fire shell over the promontory of Southend pier and Fort du Homet. Were this to happen the combustibles would not suffer. Just inside of these combustibles there are the great *Bassin à Flot*, the *Arrière Bassin*, and the *Avant Port Militaire.* Between these basins and a bombarding enemy there are the stores of incombustibles just named, and were shell by any chance to reach the basins across Southend pier and Fort du Homet the ships might of course be moved, and would no doubt seek the shelter of the roads. But further; just inside these basins and towards Leigh, there are located —a very good word—the shops and workshops of the dockyard. Such is the general plan. How to form a great dockyard on the open sea was first determined. How to give that dockyard the greatest possible security was next determined. How to reduce the inconvenience and loss arising from bombardment, were bombardment ever to occur, was last of all determined. And with consummate wisdom have the three essentials been settled. Englishmen have merely to study the general plan of Cherbourg Dockyard, and then to turn to the general plan of any English dockyard, and to blush at the want of method that is everywhere and in everything displayed. Cherbourg is a fighting dockyard, one that scarcely admits of being destroyed or taken, while there is not an English dockyard that is really proof against conflagration and destruction by a single shell. The principle of Cherbourg is defence in combination with aggression, and unquestionably the (Cherbourg) principle is the only safe one against the iron-clads, the great charges of great smoothbores, and the high velocities of the rifled weapons of present times.

The interior aspect.

But returning to the *gendarme* and the interior aspect of the dockyard. We have entered at the short south end of the parallelogram, and, in doing so, have passed the prefecture and the various departmental offices, which obviously are beyond the reach of all danger from the sea. In front there is a great esplanade, on which sailors and soldiers from the neighbouring barracks may be exercised or paraded for service in the forts or on board the ships. This fine open foreground, with rows of regularlyformed handsome buildings stretching beyond in all directions, gives the fine effect that elicits your warm approval. But something more than mere effect enters into the arrangement that is so pleasing. These Frenchmen are far-seeing, prudent fellows. The interior of the Dockyard is a plain, studded ingeniously as well as prettily with workshops and stores, which, if there ever is a need be, will form so many lines of defence, behind which troops may form in safety and emerge to dispute every foot of ground. Disembark where he may, an enemy will be encountered at every step and turn, and he can therefore hope for no other fate than that of being buried in the ruins of the stronghold with its defenders.

The workshops and stores.

In the workshops and stores there are commendable adaptation and utility. The *gendarme* leads the way into the first row of buildings. There, as the saying is, is a sight for sore eyes. The line of buildings stretches two-thirds of the way across the parallelogram, and may be said to form the last defensive position within the Dockyard where possession would be disputed. That is the remote use of the buildings. The present uses are various. Towards the water-side there are facilities for laying hold of floating timber, and such timber is stored in the water-side end of the line of buildings. Mark the saving of labour, no dragging from place to place, and from the water to the store is but a step. Pass from the water-side end of the line of buildings, to the farther and inland end. This also is a timber store, but for the better kinds only which may be brought by railway or otherwise from different parts. Mark the judicious separation. But what is in the centre of the line of buildings? In one place saw-mills; in another a joiner's shop; in a third a carpenter's or boat-builder's shop. Why so situated? The saw-mills and shops are under the same roof as the stores of timber, because the timber is wanted in the shops and saw-mills. You pause and reflect for a moment: yes, the timber is exactly the kinds required, and in the stores it lies ready to the workmen's hands. One question more: yes, these minor timber stores are replenished from time to time out of the great timber stores, which generally are not within the dockyard at all, but in some secure neighbouring part under water. Explanations such as these cast some light on the wherefore France gets so much and we so very little out of the enormous sums voted annually for the navy. But, *gendarme*, move on. We are next beside the workshops and stores of the Port Militaire et Arsenal. The shops; the model shop, foundry, blacksmiths' shop, boiler shop, coppersmiths' shop, erecting shop, &c., are all convenient for the work, and all on a scale of magnitude commensurate with the probable necessities of France in the gravest possible emergency. They are also stocked with the best tools; the inventions or manufacture of Nasmyth, Rigby, and Whitworth, of England, of Mazeline and others of France and Belgium. Nothing is wanting, and nothing out of place, for the instant overhaul, refit, or repair of the most powerful fleet. The skilled workmen for so great an effort are alone wanting; but these in every private workshop over the length and breadth of France are inscribed for service, or, by decree, may instantly be inscribed for service, and *en route* for Cherbourg, or any of the other dockyards to which they may be ordered. France has no other means of providing for great occasions; not possessing the vast resources of England in private workshops. That this disadvantage of France as compared with England should never have been considered by English panic-mongers is not creditable to their intelligence; and that successive British governments should never have distinguished between England with private establishments and France without them, in running what may well be called the dockyard race, is something more than a marvel. But, *gendarme*, proceed. We are next beside the rope-walk, the sail-loft, the mast and boat-houses. The site of these has been determined more by security than convenience. They are situated where danger is improbable, and also in positions that may be called strategic. Rather oddly the establishments for these things are on a much less scale than those for overhaul, or equipment and repair. Indeed it may with truth be said that France is rather remiss in those. France appears to attach comparatively little importance to the propulsion of ships otherwise than by steam. For all the ships of war usually in reserve at Cherbourg, an emergency might bring to light the awkward fact that there were probably fewer spars and sails and less cordage than might be necessary. But the stock of such things obviously admits of being soon replenished to an extent beyond even the most pressing wants. And were it to happen that before any actual deficiency could be supplied the reserve ships would be required to fight, there is no reason why they should not render efficient service. Going into action now-a-days is not as it was forty or fifty years ago. Then all ships were propelled by sailcloth and cordage; now-a-days they are generally propelled without the use of sailcloth or cordage, and by means of coal. No doubt enlightened views are at the bottom of French unwillingness to create useless stocks of articles that are not likely to be required. That we continue plodding as we always have done, ignoring discovery and progress, is a circumstance of some significance, and one deserving of attentive consideration.

The basins, docks, and slips.*

The basins, docks, and slips which have been passed in the progress through the Dockyard are numerous and capacious. Some of them have been referred to already. There are three great basins—the first or outer the Avant Port Militaire or Dock Napoleon I., inaugurated by the Empress Maria Louisa in 1813. This is a basin of 15 acres, with entrance to the roads and outlets to the other basins. The second, or inner basin, known as the Bassin à Flot, was commenced in the same year, and communicates with the first by lock gates. The dimensions in round numbers are—length, 1,000 feet; breadth, 700 feet; width of lock gate entrance, 80 feet; area, 14 acres. The third, or Dock Napoleon III., known as the Arrière Bassin, was commenced in 1836, and inaugurated by the Emperor and Empress in 1858. The dimensions in round numbers are—length, 1,320 feet; breadth, 700 feet;

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* The following are the particulars of the Portsmouth docks and slips:—

| Name or number of dock. | Length in blocks at bottom of dock. | | Width of entrance. | | Remarks, &c. |
|---|---|---|---|---|---|
| | ft. | in. | ft. | in. | |
| No. 1, South harbour dock ... | 228 | 3 | 57 | 7 | |
| „ 2, South-east basin dock | 221 | 6 | 63 | 4 | |
| „ 3, South basin dock ...... | 275 | 2 | 67 | 6 | |
| „ 4, Middle basin dock...... | 279 | 3 | 67 | 6 | |
| „ 5, Middle basin dock...... | 208 | 3 | 55 | 4 | Being made 4 ft. 3 in. deeper. |
| „ 6, Harbour dock ......... | 189 | 8 | 52 | 11 | |
| „ 7,<br>„ 10, } Double docks............ | 644 | 10 | 80<br>88 | 5<br>6 | |
| „ 8, South inlet dock ...... | 302 | 10 | 70 | 0 | |
| „ 9, Dock .................... | 253 | 4 | 64 | 11 | |
| „ 11, North inlet dock ... ... | 406 | 0 | 70 | 0 | In course of construction. |

width of lock gate entrance in the Bassin à Flot, 70 feet; area, 20 acres. In addition to these great basins there is the minor one of the Port Militaire et Arsenal, the Avant Port du Commerce, and the Bassins du Commerce. The area of these latter is at a guess not less than thirty acres; but the Avant Port du Commerce, although eligible for the refit of ships of the largest class, has no lock gates. So much for the basins. Let us next turn to the docks. The Dockyard dry docks are now nine in number, six being of the largest class, two of the second class, and one old. To the Avant Port Militaire there are three docks, to the Bassin à Flot there is one, and to the Arrière Bassin five. The lengths range from 250 feet to 600 feet, and the breadths from 58 feet to 70 feet. So much for the docks. The building slips are nine in number, and all first class, five of the number being new and uncovered, and four old with houses over them. The five new slips launch into the Arrière Bassin, and, being furnished with flood gates, are convertible into docks at pleasure. Of the slips nothing more need be said than that the new ones are formed of great granite blocks throughout, and that these are held in reserve for iron shipbuilding. Like the slips, the docks and basins are formed throughout of granite, and besides with the same material the quays and roadways are all paved. In a word, Cherbourg is a granite Dockyard, the greatest work of the kind in modern times. The beauty and excellence of its masonry are of themselves worthy of a visit.

A visit to the ships.

Having now gone over the Dockyard, there in the Bassin à Flot, and the Arrière Bassin, are the ships which formed Vice-Admiral Penaud's experimental squadron. A visit to them will be interesting, and while it is taking place the *gendarme* loiters or gossips on the quay, not venturing on board. The nearest ship is the iron-armoured *Couronne*, and the presentation of the authority of the Minister of Marine is sufficient to command the greatest possible attention.

The *Couronne*.*

The *Couronne*, or *Crown*, was built at Lorient from the designs of M. Audenet.

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* The following is a statement of the proportions of our iron-armoured and iron-clad ships:—

*Return of Iron-plated or Armour-clad Ships Built or Building; Names; Tonnage; Horse-power; expected to be Launched; whether Hull is built of Iron cased with Armour Plates, or of Wood cased.* (*Return dated 22nd July*, 1862.)

| Names. | Tons. | Length between Perpendiculars. | | Extreme Breadth. | |
|---|---|---|---|---|---|
| | | ft. | in. | ft. | in. |
| Agincourt ... ... ... ... ... | 6,621 | 400 | 0 | 59 | 3½ |
| Minotaur ... ... ... ... ... | 6,621 | 400 | 0 | 59 | 3½ |
| Northumberland ... ... ... | 6,621 | 400 | 0 | 59 | 3½ |
| Achilles ... ... ... ... ... | 6,079 | 380 | 0 | 58 | 3½ |
| Black Prince ... ... ... ... | 6,109 | 380 | 2 | 58 | 4 |
| Warrior ... ... ... ... ... | 6,109 | 380 | 2 | 58 | 4 |
| Hector... ... ... ... ... ... | 4,089 | 280 | 2 | 56 | 5 |
| Valiant ... ... ... ... ... | 4,063 | 280 | 0 | 56 | 3 |
| Defence ... ... ... ... ... | 3,720 | 280 | 0 | 54 | 2 |
| Resistance ... ... ... ... ... | 3,710 | 280 | 0 | 54 | 1 |
| Prince Albert ... ... ... ... | 2,529 | 240 | 0 | 48 | 0 |
| Caledonia ... ... ... ... ... | 4,125 | 273 | 0 | 59 | 2 |
| Ocean ... ... ... ... ... ... | 4,047 | 273 | 1 | 58 | 5 |
| Prince Consort ... ... ... ... | 4,045 | 273 | 1 | 58 | 5 |
| Royal Alfred ... ... ... ... | 4,045 | 273 | 0 | 58 | 5 |
| Royal Oak ... ... ... ... ... | 4,056 | 273 | 0 | 58 | 6 |
| Zealous ... ... ... ... ... | 3,716 | 252 | 0 | 58 | 7 |
| Royal Sovereign ... ... ... | 3,963 | 240 | 7 | 62 | 0½ |
| Favourite ... ... ... ... ... | 2,186 | 225 | 0 | 46 | 9 |
| Research ... ... ... ... ... | 1,253 | 195 | 0 | 38 | 6 |
| Enterprise ... ... ... ... ... | 990 | 180 | 0 | 36 | 0 |
| **Floating Batteries.** | | | | | |
| Erebus... ... ... ... ... ... | 1,954 | 186 | 8½ | 48 | 6 |
| Terror... ... ... ... ... ... | 1,971 | 186 | 3 | 48 | 8 |
| Thunderbolt ... ... ... ... | 1,973 | 186 | 11 | 48 | 5¾ |
| Ætna ... ... ... ... ... ... | 1,588 | 186 | 0 | 43 | 11 |
| Glatton ... ... ... ... ... | 1,535 | 172 | 8 | 45 | 2½ |
| Thunder ... ... ... ... ... | 1,469 | 172 | 6 | 43 | 11 |
| Trusty ... ... ... ... ... | 1,539 | 173 | 6¼ | 45 | 1¾ |

Since the date of this return there have been several additions.

A question addressed to the gentlemanly officer in charge elicits the following peculiarities of construction, as well as the fact that the ship is thought impregnable against English guns. There is, first of all, on the inside, the frame and skin of an iron ship, next a thickness of teak, then the skin of an iron ship again, next a thickness of teak again, and, last of all, on the outside, four inches of armour-plating on the load line, diminishing slightly above and below. The inner thickness of teak is eleven inches, and the outer thickness four inches. These are indeed structural peculiarities, and as there has been no similar target trial at Shoeburyness or Portsmouth, the Vincennes experiment of 1857, testing a section of the *Couronne*, may, at least for the present, be taken as conclusive on the point of invulnerability. The length of the *Couronne* is 260 feet; breadth, 54 feet 3 inches; draught, 23 feet; height of battery, 6 feet; displacement, 6,000 tons. The length is therefore, as near as can be, five times the breadth, while the length of the *Warrior* is some seven times the breadth. This is another structural peculiarity of the *Couronne*. The ship is shorter than ours; the fulness extends sufficiently forward and aft to justify the opprobrium of old-fashioned in this country; but the ship nevertheless is shapely, with a fine entrance forward and clearance aft. The shortness and fulness are said by the officer in charge to give greater stability and handiness than are possessed by our ships, and without any sacrifice of speed. And this is to be received as an expression of opinion deserving of respect, because in the next breath the same officer dilated on the imperfect ventilation and humidity of the ship, with consequent discomfort and unhealthiness of crew and officers. The plating extends from stem to stern, and from the bulwarks to some feet below the load line. The decks are flush fore and aft, as well as clear fore and aft, there being no bulkheads unless in the hold, which is divided into seven compartments. Guns are only carried on the gun deck, and the armament consists of forty rifled 32-pounders, throwing a 32 lb. spherical shot, or a 99 lb. steel bolt, with a bursting charge varying from 7¾ to 16 lb., when hollow shot is used. The diameter of the 32-pounder is, as near as can be, 5½ inches.

The *Normandie.*

The *Normandie* is the next ship. Captain Jauréguiberry, a fine specimen of a sailor, is on the deck promenading with the chief officer. He says it will afford him great pleasure to send an officer over the ship with the writer, but, entering into conversation with Captain Jauréguiberry, the services of an officer are unnecessary. He is a gallant fellow, an officer anxious to vindicate his ship from unjust aspersion, and to uphold the honour of the French marine. Against such men it would be no easy matter for England to find itself opposed. And the proverb, like master like man, holds good of the officers and crew of the *Normandie.* Officers and crew appear to emulate their captain in the spirited discharge of their duties. The *Normandie* was the first iron-clad that crossed the Atlantic. The voyage to and from Mexico was made in 1862, when extremely heavy weather was encountered during part of the voyage, the ship behaving in a most satisfactory manner.*

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* After the experimental cruise, one of the French newspapers published the following short and interesting account of it:—

L'ESCADRE CUIRASSÉE.

Nous avons rendu compte des premières expériences comparatives de la division des navires cuirassés en essai. Cette division, commandée par l'amiral Charles Penaud, se composait de deux vaisseaux, *le Solferino* et *le Magenta*, et de trois frégates, *la Couronne*,

The *Normandie*, therefore, in the recent experimental cruise was not an untried but a thoroughly tried ship, while all the other iron-clads were practically untried. Aware of what his ship could do, Captain Jauréguiberry steadfastly and fearlessly maintained the

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*la Normandie*, et *l'Invincible*. Le vaisseau en bois, *le Napoléon*, avait été annexé à l'escadre pour servir de terme de comparaison : mais ce vaisseau, créé par M. Dupuy de Lôme, est le chef-d'œuvre de l'ancienne architecture navale, et il est très long comme le sont les derniers types. Le terme de comparaison n'étant conséquemment pas suffisant, on a adjoint à l'escadre, pour représenter les anciens navires, *le Tourville*, ancien vaisseau mixte et court par rapport aux autres.

La division partie de Brest le 20 octobre, à neuf heures du matin, devait se rendre à Madère, et se livrer pendant les traversées d'aller et de retour aux expériences de vitesse comparative, de consommation de charbon, de tir à la mer, de navigation à la voile et de mouvements giratoires.

Les expériences de vitesse comparative ont eu lieu successivement à deux, quatre, six et huit chaudières. La division, rangée sur une ligne de front, partait chaque fois à toute vapeur au signal donné par l'amiral dont le pavillon flottait, depuis le départ de Brest, à bord de la frégate *l'Invincible*. Au moment du départ, chaque navire prenait lès relèvements exacts des autres navires, et à l'instant où la lutte finissait, d'autres relèvements indiquaient de quelle quantité angulaire chaque navire s'était déplacé relativement aux autres.

La lutte à deux chaudières a donné les résultats suivants par ordre de vitesse : *Solferino*, *Normandie*, *Couronne*, *Napoléon*, *Invincible*. *Le Magenta* a signalé pendant la lutte un tres mauvais charbon, qui l'empêchait d'obtenir la pression ordinaire. Voici quel a été dans les luttes suivantes l'ordre de vitesse :

Lutte à quatre chaudières : *Solferino*, *Magenta*, *Couronne*, *Napoléon*, *Invincible*. *La Normandie* a signalé dès le commencement une avarie dans sa machine et n'a pas pris part à la lutte. *Le Solferino* a obtenu 11 nœuds, et *l'Invincible* 8.

Lutte à six chaudières ; *Solferino*, *Magenta*, *Couronne*, *Napoléon*, *Normandie*, *Invincible*. La vitesse du *Solferino* a été de 13 nœuds, et celle de *l'Invincible* de 13 nœuds 5.

Lutte à huit chaudières : *Solferino*, *Magenta*, *Couronne*, *Normandie*, *Napoléon*, *Invincible*. *Le Solferino* a atteint 14 nœuds, et *l'Invincible* 11 nœuds. *L'Invincible*, battu dans toutes les luttes, avait obtenu l'année dernière des vitesses égales à celles des autres bâtiments ; il est probable qu'il recouvrera son ancienne marche.

Le vaisseau mixte non cuirassé, le *Tourville*, ancien type, n'a pu sérieusement prendre part à aucune lutte de vitesse.

Les évolutions à la voile ont offert un grand intérêt. Il importait de savoir si les navires cuirassés avec leur voilure actuelle peuvent marcher suffisamment et virer de bord. *La Couronne*, qui possède une mâture plus complète que celle des deux vaisseaux et des deux autres frégates, a obtenu une marche supérieure. Sont venus ensuite *la Normandie*, le *Solferino*, le *Magenta*, et *l'Invincible*. Les évolutions des bâtiments cuirassés, exécutées par une forte brise, ont paru un peu plus lentes que celles des navires en bois.

L'escadre n'a pas eu à souffrir du mauvais temps ; mais arrivée à la hauteur du cap Saint-Vincent, elle a dû prêter le travers à une très-grosse houle du nord-ouest, survenue fort à propos pour lui permettre de faire des essais comparatifs de roulis. On notait à bord de tous les navires, au moyen d'instruments de précision, les amplitudes de roulis d'un bord et de l'autre, et chaque navire signalait en même temps le roulis maximum obtenu. Les tableaux ainsi dressés démontrent que *le Solferino* et *le Magenta* roulent moins que *la Couronne*, celle-ci moins que *la Normandie*, et enfin cette dernière

order of sailing throughout the cruise, while some of the other ships, for the sake of comfort, failed to do so. But not only was the order of sailing rigorously observed on board the *Normandie;* under the most adverse circumstances the ports were opened, the tackles cast adrift, and the guns fired. It was then that the green seas entered the ports and washed the gun deck. No one, however, was alarmed, because there was no danger. The fires were not put out nor the speed of the ship

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un peu moins que *l'Invincible.* Les deux vaisseaux *le Solferino* et *le Magenta* ont des amplitudes de roulis qui dépassent de très-peu celles *du Napoléon* et *du Tourville.* On procédait en même temps aux expériences de tir à poudre et à boulet, et l'on s'est surtout attaché à voir jusqu'à qu'elle limite extrême les sabords pourraient rester ouverts. Quand le tir est possible pour les anciens navires, il l'est également pour les cuirassés. Les craintes que l'on avait sur l'insuffisance de hauteur des batteries étaient donc, sinon dénuées des londements, au moins très-exagérées. On est édifié aujourd'hui et très-rassuré. Un tir fait en filant douze nœuds, a même été reconnu infiniment plus facile aux navires cuirassés qu'aux autres, parce qu'étant très-fins de l'avant et déplaçant moins d'eau la mer est peu sou-levée et ne menace pas d'envahir les sabords.

Nous passons sous silence les rapports de vitesse des navires entre eux, les évolutions de toute sorte exécutées avec une précision remarquable pour arriver au mouvement giratoire qui fait l'objet de cet article.

Arrivée en vue de l'île Teneriffe, l'escadre s'est livrée, par une mer magnifique, aux expériences giratoires à la vapeur. Le dessin que nous donnons, dû au crayon de notre collaborateur et très-habile peintre de navire, Derand-Brager, représente l'escadre pendant les expériences qui offraient un intérêt tout spécial. Plus un navire marche vite, et plus tôt son mouvement complet de giration est terminé; il fallait donc rendre les conditions égales en prescrivant une vitesse uniforme. Au signal donné, tous les bâtiments mettaient la barre du même bord, à l'angle signalé, et décrivaient une circonference au bout de laquelle ils se retrouvaient en ligne. On déterminait, d'après l'espace parcouru et la durée de l'évolution, le diamètre de la circonference décrite, dont la longueur se trouvait en raison inverse de la facilité d'évolution de chaque navire. Les expériences ont dure trois jours et ont éte répétées pour chaque angle de 5º en 5º pour chaque bord, jusqu' à l'angle maximum de barre.

Il est important de savoir en combien de minutes un navire peut tourner sur lui-même. Dans un combat le succès est presque assuré au bâtiment qui tourne rapidement autour d'un ennemi plus lent dans ses mouvements. Ce dernier est toujours atteint dans ses points les plus vulnérables. Plus, un navire est court et plus vite il accomplit son mouvement de giration; aussi *le Tourville*, ancien type des vaisseaux couris, à tourne beaucoup plus rapidement que les autres. Parmi les bâtiments cuirassés, *la Couronne* a obtenu une très-grande supériorité sur *la Normandie* et *l'Invincible*, et surtout sur *le Magenta* et *le Solferino.* L'infériorité des vaisseaux tient à une cause incontestable, leur plus grande longueur par rapport aux frégates, et à une cause coutestée, la présence de leur éperon.

En somme, les expériences ont démontré la supériorité des vaisseaux sur les frégates, et la supériorité de *la Couronne* sur le type de *la Normandie* et de *l'Invincible.* Comme résultat général, elles ont donne la preuve que la France possède une escadre cuirassée incomparable.

L'escadre est rentrée à Cherbourg le 23 novembre, à midi.

slackened, all statements to the contrary being untrue. With their ship, Captain Jauréguiberry, the officers, and crew are contented. Not an envious or disparaging word as regards the other ships fell from any one. Still Captain Jauréguiberry feels that his ship had not been fairly treated by M. Xavier Raymond in the *Revue des Deux Mondes*, and knowing the writer to be a member of the London press, he felt bound to make the explanations that are here offered in vindication of himself, the officers, and crew of what he was pleased to call "the good iron-clad ship *Normandie*." The *Normandie* is a mere reproduction of the *Gloire*. Built from the same mouldings, and engined from the same drawings, there should not be a pin to choose between them; and why the *Gloire* should have been so much praised and the *Normandie* so much disparaged will, to most candid people, stand in no need of explanation. The dimensions of the *Normandie* are—length at the load line, 253 feet 6 inches; breadth, 55 feet 3 inches; draught, 22 feet 9 inches; height of battery, 5 feet 8 inches; displacement, 5,600 tons. The length of the ship is therefore less than five times the breadth; while the length of the *Warrior* is some seven times the breadth. Standing on the deck, one is reminded of the great breadth of the *Royal Sovereign*, Captain Cowper P. Coles's razeed cupola ship. The *Normandie*, like all the other French ships, is built to carry and fight her guns; our ships, on the contrary, are built to develop some theory, and must do the best they can with whatever guns the War-office or the Admiralty may be pleased to order them. This is a home truth. The *Normandie* is armoured round and round on the wood plank and frame of the ship with 4½-inch plates. The bottom is coppered, and to prevent the chemical action of the copper on the armour-plates, a vacant or neutral strip a foot in width goes round the ship, which, during the experimental cruise, was filled with cement. The cement did not, however, stand well, and some other substitute must now be found. Like the *Gloire*, the *Normandie* carries an armament of 36 cast-iron rifled 32-pounders—4 guns fewer than the *Couronne*.

The *Invincible*.

If the inspection of the *Normandie* left a pleasing impression on the writer's mind, what shall be said of the visit to the *Invincible?* The writer walked on board, and Captain Tabuteau was in the act of hearing the roll called of the crew. Apologising for the short time that would be occupied in that duty, he proceeded with it without more ado. In soldier-fashion the men answered to their names, and the captain went up and down the ranks of the two watches, mildly censuring here, strongly censuring there, then warmly commending or encouraging. A plain man, with the manner of a gentleman rather than of a sailor, he was perfectly at home among his men, and they, while manifestly under close discipline, were equally at home with him. It was a refreshing spectacle, not a taint of martinetism, no display of superiority, but an officer discharging a duty in a manner calculated to command the affection as well as the obedience of one and all. The British Navy has anything but a superabundance of officers of the class of Captain Tabuteau. The inspection ended, the captain led the way to his cabin. Here was another apology for the cleansing and doing up it was undergoing. From the cabin to the ward-room, from there to the officers' state rooms, then to the gun deck, the lower deck, the engine room, stokehole, the store rooms, shell rooms, wing passages, well-holes,

&c. Flesh and blood could barely stand it, after the previous exertion of the day. The kind attention of Captain Tabuteau positively knew no bounds. Every hole of his ship had to be seen into, and it is but justice to him to state that in the overhaul there was nothing found amiss, and not a man absent from his station. Further, in those recesses where there is no current of air passing and perpetual darkness reigns, no bad smell existed—a circumstance abundantly accounted for by the freest possible use of whitewash. In the *Invincible* there are no compartments, no bulkheads, no separation even between the stokehole and the engine room. Throughout the ship the temperature is equalised, and constant air-currents are maintained. The inspection ended with a visit to the hospital, in which there were several blue jackets and marines too ill to be removed. The hospital part of all the French iron-clads is a deck forecastle. The *Invincible* is another of the *Gloire* class, armoured and armed like the *Normandie.* Both ships are of the same dimensions.

The *Solferino.*

Captain Tabuteau, still unsatisfied with what he had done, accompanied the writer on board the *Solferino*, introducing him to the captain. Then followed the inspection of the *Solferino*, but not in the same detail as in the case of the *Invincible.* A nobler iron-clad than the *Solferino* does not swim. Built to steer well, sail well, and maintain a steady platform for the guns, all the three qualities are happily combined.*

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* There is nothing here inconsistent with the statement in the previous chapter that the better ships of war would be those unarmoured ones of mere wood or iron. Why this is so is obvious from the fact that the moment you hang armour plates on the sides of a ship you necessarily render such a ship less seaworthy, or less steady as a gun platform than were there no armour plates. Hence the superiority of unarmoured to armoured ships. But there is this peculiarity in the *Solferino* and the *Magenta*, and it is most remarkable that those ships, by reason of more skilful architectural design, are

It was a trying problem, and all praise to the successful architect. France owes him a debt of gratitude that it cannot adequately repay. How iron-clads should be built is the point arrived at, so that the waste and uncertainty of years passed in experimenting are entirely obviated. Taking the hint, as will appear hereafter, the iron-clad batteries building at Bordeaux are *Solferinos*, adapted for coast instead of sea-going work. The dimensions of the *Solferino* are—length, 279 feet 6 inches; breadth, 55 feet 3 inches; draught of water, 25 feet 8 inches; height of lower battery, 6 feet; displacement, 6,800 tons. The length is exactly five times the breadth, while the length of the *Warrior* is some seven times the breadth. And what are the effects of this difference? In the heaviest weather two men steer the *Solferino* comfortably; in the heaviest weather the *Warrior* practically will not steer at all. In the heaviest weather the *Solferino* can use her guns, nay, use them well; in the heaviest weather the guns of the *Warrior* are yet untried. Last of all, the *Solferino* steams from two to three knots an hour more than the *Warrior*. In the French Navy there is no larger ship than the *Solferino*; and, notwithstanding the great breadth, there certainly is not a ship with finer lines. Captain Tabuteau is of opinion that the peculiar form of the bow, with its well-adjusted ploughshare, con-

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more seaworthy or more steady gun platforms than any of the French unarmoured ships. They are no doubt also superior to our unarmoured ships. Such a fact, however, only proves that naval architecture is in an exceedingly backward state, and that better craft than the *Solferino* and *Magenta* are possible without armour. Then it is to be considered that probably the performance of the *Solferino* and *Magenta* are exaggerated by the French officers; and, if so, it will be more clear still that good unarmoured ships of great speed, with good guns, would be a match for armoured ships in heavy weather. Of heavy weather there is, as is well known, abundance in the open sea, for it is next to impossible, even in midsummer, to make a ten days' Atlantic voyage to New York on board a Cunard steamer without encountering one or two days of downright blowing.

tributes more than anything to the great speed attained. Perhaps he is right—at least, the ploughshare is no hindrance to the ship; but in the *Solferino* there is the absolute perfecting of the lines of the *Gloire*. The *Gloire* unquestionably was the greatest forward step that ship construction science had made during several years; the *Solferino* now occupies the foremost place. The *Gloire* was a ship of short midship length, and roomy well-fashioned ends to get a clear entrance and good departure through the water. But it was something more. The ship rested, so to speak, on the midship length, the ends playing buoyantly, the structure yielding freely to every motion, and obeying, without resistance, every movement of the helm. Still there were jars. The theory was sound, but not worked out fully. In the *Solferino* theory and practice are in harmony, and it is because they are so that the *Gloire* has been surpassed in all good sea-going qualities. In the armament of the *Solferino* there are the peculiarities, first, of the armament being carried on two decks instead of one, and of the guns being breech instead of muzzle loaders.* Fifty-two rifled breech loading 32-pounders are carried, and it is said that as soon as a sufficient number of guns have been provided at the arsenals breech loaders will supersede the cast iron and wrought iron muzzle loaders which are in general use at present. The guns are more simple and less liable to derangement than the Armstrong service breech loaders, there being no vent-piece to blow out, and no part of the gun detached. In justice to Sir William Armstrong it may be stated that his vent-piece breech loaders are not his only breech loaders, nor even his best breech loaders. The wedge breech loaders so far are unexceptionable. Over not more than two-thirds the length of the side are the armour-plates carried, and the unprotected extremities are, as in the case of the *Warrior*, protected by athwart-ship shot-proof bulkheads.

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* Captain Tabuteau kindly ordered the unscrewing of the breech of one of the *Solferino's* guns for the writer's inspection. The construction is exceedingly simple and, as experience has proved, most efficient. The breech piece, as it may be called, screws out in the rear of the gun, and that portion of it which forms the chamber of the gun is a hollow of the diameter of the charge. Behind this hollow the breech piece is solid, and it is on this solid part that the reeds of the screw are. A turn or two of the screw by a kind of handle exposes the hollow of the breech piece into which the charge is placed, and a turn or two restores it to its place. The handle by which the screw is turned then drops into a stout hook or slot on the caskable of the gun, and holds the breech piece fast. The writer was assured that the plan answered admirably, and that breech guns so constructed are for various reasons preferable to muzzle loaders on board ship. Two of these reasons may as well be named: first, the ship's ports are always kept closed; and second, breech loading, especially in heavy weather, is much more rapid than muzzle loading.

The *Magenta*.

The *Magenta*, the last of the iron-clads that took part in Admiral Penaud's cruise, was lying in the roads inside the breakwater. Built on the same lines, fitted, rigged, and armed in the same manner as the *Solferino*, it is needless to indulge in descriptive repetition. In the possession of two such ships as the *Solferino* and *Magenta* France is truly formidable in comparison with ourselves, because those ships will manœuvre well when ours will not, open their batteries when ours could not, and if need be, run away from a greatly superior force when ours might be overtaken and overpowered.

The other ships.

The other ships of interest at Cherbourg were the iron-clad *Flandre*, in course of construction, the Roman galley, and the once-famous *Tortoise*, these last the invention of the Emperor. The *Tortoise*, shored up high and dry on one of the building slips, is an object of neglect. Its little day has gone by when it disturbed the nerves of timid Englishmen by visions of unseen voyages across the Channel, and fearful depredations in the Thames and elsewhere. The truth is, the *Tortoise* was only formidable to those foolhardy enough to be on board when in the water, and never ought to have frightened others. Constructed in ignorant violation of the laws of floating bodies, it would not swim. Paraded as a marvel by those who are bound to applaud everything that the Emperor sets about, the blunder was committed of accepting whimsical conjectures for accomplished facts. Let Spithead be set on fire by what it may, the *Tortoise* is doomed not to bear a part. The *gendarme* shrugged his shoulders at the very sight of it, and could not conceal the ridicule to which inquiry and examination exposed him. On a scale equal to a capacity of fifty or sixty tons an iron tortoise was constructed. The entrance and exit to the ship are down two chimneys, each little more than the size of the funnel of a locomotive, and the expectation was that the tortoise would not only swim along unperceived, but that the water would not find its way down the chimneys and drown the crew. The expectation was that because the Emperor had designed to invent the tortoise, it would do exactly as he pleased and accomplish all he wished. Immediately behind the *Tortoise*, on the same slip, is another Imperial whim, which it is almost a shame to name, the Roman galley for the Empress. It was also to accomplish great things, and certainly its first appearance on the Seine was warmly greeted by the assembled Parisians. But Roman galleys, apart from their associations, were a backward move. The gilding is now faded, the upholstery in decay, and no doubt when the Emperor next visits Cherbourg he will order the galley and the tortoise to be sunk together in his presence outside the breakwater. Nothing can be more calculated to annoy him than the follies of other days unexpectedly staring in his face. The *Flandre* is a fine ship of the *Gloire* type, pierced for 38 guns, all of which are to be 5½-inch steel breech loaders, throwing shot of 180 lb. with a high charge. All the beams of the *Flandre* are iron, and there is an iron deck beneath the wood one. In the hold there are seven bulkheads, but none either on the lower or gun deck.

Such are Cherbourg and the ships.

Such are Cherbourg and the ships. Both are worthy of the attentive consideration of Englishmen of all classes. The ships are in several respects superior to our own, although in some respects they are inferior. For speed, manœuvring, and stability—and really there is little more worth attending to—there are no such ships afloat or building. France has tried its ships, tried them thoroughly in all essential points, and there is nothing left to be desired. With its ships it is ready any hour to fight. English ships, on the other hand, are not only untried, but, let us blush to add, English officers are themselves untried. The present generation of British naval officers have not, up to the present hour, been allowed to learn their business, and if war unhappily overtakes us before a change in this respect is introduced and has borne fruit, England promises to cut as poor a figure on the ocean as American Brigadier-Generals on both sides have done since the American war began.*

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* A distinguished naval officer, who candidly admits getting his steps in rank *by favour*, and not *by merit*, told the writer the other day—he is an officer quoted very freely as an authority on all naval subjects—that in his opinion not half a dozen naval officers could be found at the present time qualified for the serious duties that a great war would impose on the service. Of course the system, and not the officers, is to blame. The system is a peddling one—one for the convenience of the Admiralty and Government of the day, and the worst conceivable for upholding the interests and honour of this great country.

## CHAPTER III.

## BREST.

A natural Dockyard.* Brest, the second French port of war, and the second French construction port, possesses what may be called a natural Dockyard. Nature has provided all with the exception of the casemates and cannon for protection, the docks for repairing, the ships for building, and the shops for workmen. But hereafter art will have done nearly as much as nature. The whole Dockyard is in a transformation state. When the

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* Chatham may be said to be the English offset to Brest. It is an Elizabethan Dockyard, but now about to become, by the extensions on St. Mary's Island, a Victorian one. Admiral Robinson and the Duke of Somerset have, however, had more to do with the enlargement than her Majesty the Queen. Certainly the Medway is one of the best positions in England for a Dockyard, because one of the most secure; and the only thing to be regretted in the St. Mary's Island extension is the absence of any clear official ideas on the subject of what a Dockyard should be. A very large portion of the extension is intended for iron manufacture, notwithstanding that England may be called the iron workshop of the world, and notwithstanding that the destruction of the *Lord Warden* target at Shoeburyness must cast very serious doubt on the propriety of constructing iron armoured, or iron-clad ships. Had the Admiralty restricted themselves to the excavation of docks and basins, seeing that the labour is convict labour, no great harm would have been done, although by and by, with the Thames Iron Works and other limited companies supplying the most capacious docks, the wants of the Thames will soon be abundantly supplied either for peace or war. In Chatham Dockyard there is an aggregation of manufacturing establishments worthy of the middle ages. Everything is produced just as if there were no England outside of the Dockyard walls. How things are managed may be gathered from what befel the writer on a recent visit. Arriving at the Dockyard gate a half an hour or so before dinner-time, it was necessary to proceed at once to the Captain-superintendent's office, to obtain permission to remain on board the *Achilles* during the absence of the workmen. In the absence of the captain-superintendent, his clerk or secretary immediately granted the permission, verbally, in the presence of the accompanying policeman. The writer at once proceeded on board the ship. Soon afterwards the dinner-hour arrived, and an individual presenting himself to the writer, asked him to leave the ship and Dockyard. The writer, of course, instantly stated that he was authorised to remain by virtue of a police order given by the Captain-superintendent's clerk or secretary. This did not appear to be

Emperor visited, in 1858, a new site was chosen for the commercial harbour,* between the Chateau and L'ance de Kerhuon; and that fine harbour will soon be finished. By this arrangement the Dockyard will receive a practical extension of a fourth—the old commercial harbour being appropriated. Then high up on the Recouvrance side labourers have been long at work, blasting the granite cliff, and clearing away; and already the sites of more than one great dock have been provided. In fine, the Dockyard will hardly be recognised by old visitors in a year or two. It will be completely renovated and modernised, and it must be confessed that both were

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perfectly satisfactory, and a third person was left for a time with the writer. Then the individual returned stating that he had been at the Master-shipwright's office, and the Master-shipwright had given no orders for any one to remain on board the ship or within the Dockyard, and therefore the writer must leave, and leave immediately. What was to be done? Why, to insist that under the circumstances the removal must be by force. Very well, responded the individual, and leaving the ship, went to the further part of the Dockyard, to the policeman on the beat, who of course knew nothing of the order given to his superior officer. The policeman came, and force was not resorted to, the policeman yielding to the request of the writer to go to his superior officer before committing himself. Of course the superior officer came and explained that everything was right. But while all this was going on the Billingsgate of the two Dockyard worthies was horrible. They hated newspapers and newspaper men for the lies they told, &c. On leaving the ship the writer repaired to the office of the Captain-superintendent, who, to do him justice, was most anxious to institute an official inquiry into the matter—he having on arriving at his office confirmed the order of his clerk or secretary: this the writer declined. Thus Chatham Dockyard is afflicted with dual management; the Captain-superintendent asserting his authority, and the Master-shipwright asserting his authority. Yet Admiral Robinson coolly insists that public establishments are to be preferred to private establishments. We might just as well say in such a country as this that navy seamen, marines, or soldiers are to be preferred to working handicrafts.

The following is the Chatham dock and slip accommodation, irrespective of the St. Mary's Island extension docks and slips:—

| | Length at top of dock. | | Width of entrance. | |
|---|---|---|---|---|
| | ft. | in. | ft. | in. |
| No. 1 Dock ........................ | 222 | 5 | 57 | 0 |
| „ 2 „ ........................ | 397 | 9 | 62 | 2 |
| „ 3 „ ........................ | 347 | 5 | 62 | 10 |
| „ 4 „ ........................ | 253 | 0 | 62 | 8 |

Number of building slips—1 of 1st class and 6 of 2nd class.

* The new commercial harbour would in war become an outer naval harbour, and as such would be a very great acquisition to the Dockyard.

necessary. Brest had fallen behind the times, and all that may now be done will not restore it to the first rank. Indeed, the changes now in progress will not bear comparison with the great works at Toulon.

The sea approaches.

The sea approaches of Brest Dockyard are difficult, although it is true that the British were twice in possession. Often in making the Passage du Four coasters are wrecked. Then there are the sunken rocks abreast of Conquest, and the black rocks running out from St. Matthew's Point. Beyond the Black rocks there is La Cocq, another dangerous rock, and afterwards in the Goulet there are lines of shoals—les Fillets, Goudron, and Magon. The Goulet is the entrance from the Atlantic to the Brest roads, and is not more than a mile across, with the shoals just named in the centre, compelling all ships to pass close to the batteries, which are a *fleur d'eau*, as well as on the crests of the rugged eminences. On both sides of the Goulet the land is bold and precipitous, and in addition to the batteries commanding and crossing fire in the narrow channel, there are adjacent forts of the Cherbourg class sweeping the roadstead in all directions. Recently these defensive works have been seen to, and mounted as they are with upwards of 500 rifled guns, besides mortars, they are supposed to render the position of the Goulet unassailable, or if assailable at least impregnable. When the question of the National Defences was raised in England it will be remembered it was stated that, strengthen the works at the Needles passage as we pleased, and mount all the cannon that we liked, an enemy would still pass with comparative impunity. But an enemy forcing the Needles would choose the strong flowing tide, which would be of great service. No such assistance is to be counted on in forcing the passage of Goulet, and an enemy once disabled would have to choose between annihilation and surrender. Inside the Goulet there is without exception the best roadstead in the world. East and west—the Atlantic outside extending north and south—the roads of Brest stretch for nearly five miles; and in addition to the roads there are the great estuaries of the Landerneau and Chateaulin, within which the whole fighting ships of Europe almost might ride in safety. Both the Landerneau and the Chateaulin resemble the Medway in stillness and depth of water, but they are more tortuous, and, what is scarcely less important as regards secresy and security, they are flanked throughout by the bold rocky mountains which render the higher forts of the Goulet so truly formidable. Some miles up the entrance of the Chateaulin, and under the shade of a mountain of considerable altitude, the Brest third division line-of-battle ships and frigates are always moored.

The land approaches.

The land approaches of Brest are much less formidable than those of Cherbourg, and its reduction by an army in the field would be a comparatively easy task. Unlike Cherbourg, too, there is not prolific and industrious Normandy behind, but, on the contrary, antiquated, superstitious, and not over-abundant Brittany. But there is behind Brest what there is not behind Cherbourg, a population as fearless of the sea and as apt sailors as any Englishmen. In an arduous war the resources of Brittany as regards sailors would be very great; much more than the merely maritime population would suggest, because the peasantry would generally be available. Such a resource may be sneered at by some, but there is abundant reason to believe that it is not lightly esteemed by the French government. And the French Government are right, for these are less the days of topsail and top-gallant sailors than of men of ordinary intelligence and activity, whose legs and stomachs would not fail them in any kind of weather. In the course of the present summer there will be through railway communication from Paris to Brest, so that neither the supplies of coal nor iron will thereafter fail. At present the supply of coal is water-borne from the Welsh ports, and the contract price is not more than a pound a ton. In all the French Dockyards the patent fuel made from coal refuse and tar is preferred to Welsh coal, partly on account of the good stowage of the cakes, but chiefly because the refuse of the French coal is as good as any other for patent fuel manufacture. The tar of French coal is said to answer quite as well as Baltic or American.

The harbour.

Brest harbour is an estuary similar to that of Chateaulin, but it is towards the east, while that of Chateaulin is towards the west. A ship in Brest roads may therefore make for the harbour, Chateaulin, or Landerneau, a choice that certainly has no parallel, and one that will always confer high naval rank on Brest, although its shops, slips, and docks become antiquated or fall into decay. Approaching the harbour from the land-locked roads, formidable works again present themselves, both on the rocky eminences and a *fleur d'eau*. One can scarcely think that an enemy who ran the gauntlet of the Goulet batteries could by any chance be in a fit condition to engage the batteries at the harbour entrance. It seems impossible. It seems that Brest is not less secure than Cherbourg. It seems that what was done by the British fleet in days gone by will never be repeated, at least at Brest. Those bygone days witnessed France fighting Europe single-handed sometimes, discouraged by the brilliant successes of British admirals who have passed away, and now have no successors worthy of their fame. The want, of course, is not the fault of British naval officers, but of the wretched system which disappoints and restrains them—nay, that pauperises, if happily it does not starve them. All the training and efficiency have, since the days of naval heroism, changed sides, and in the stoutest and most numerous Dockyard casemates, France as yet possesses and employs the most formidable service guns in Europe. We of course, as all know, have our 600-pounder and ever so many other unadopted experimental guns, but in the service there is as yet nothing better than the old cast-iron smooth-bore 68-pounder. Entering the harbour from the roads you are rowing up a stream not a yard wider than the Thames above London-bridge at low water. To the right and left there are the forts with casemate guns and guns *en barbette*. Next comes the commercial harbour, with its rather busy quays, and beyond those the Dockyard. Within the Dockyard the harbour is exactly as without, a winding stream with ships of war floating on it, and quays with buildings on both sides. Overlooking you and the Dockyard are the heights, on which there are barracks, hospitals, and buildings of various kinds. We have no such harbour, nor is there another to be seen anywhere. It is as snug as the canal or the Serpentine in Hyde Park.

The town.

The town is pleasant enough in the better parts, those, namely, which overlook the roads, but in the poorer parts it is detestable in the last degree. Of filth in any form, or in any place, the Brestois have no fear, and as a consequence the population have suffered frequently from the most virulent epidemics. As a fair specimen of the immunity that filth enjoys, it is the case that since the doing-up of the principal hotel three years ago it has never once been scrubbed, whitewashed, or painted. On the floors of the public rooms there is a thick coat of dirt which smells strongly, and to make matters worse, in the smoking-room there is an aviary or happy family collection of over one hundred creatures, the dust and filth of which have sensibly increased the regular layer. Doors are faded, the paper walls tattered and unsightly, and, to save the bones of "boots," the sill of the great staircase window on the inside has been permanently converted into an open repository of shoe brushes and blacking-bottles. Such a house in England would be complained of by the neighbours, and taken in hand by the health officers, who would set to work a troop of labourers with brooms, pails of water, and lime whitewash. But in Brest the house is not merely tolerated, it is the chief resort of military and naval officers and the upper civilian classes. Fie upon them! If, however, Brest is one of the filthiest towns in France, it is also one of the very liveliest. Not an hour of the day passes without one or more military turnouts in some part or other, and at times it is not unusual to have the ear dinned with the discordant music of inharmonious tunes to which reliefs or recruits in different parts are marching. The population is some 65,000.

Access to the Dockyard.

Access to the Dockyard at the present time is only allowed to foreigners armed with the authorisation of the Minister of Marine. Formerly it was otherwise. It then was the privilege of the

Mayor either to grant orders or to recommend that orders should be granted; and the resident Consuls shared the privilege with the Mayor. Since, however, the enlargement of the Dockyard has been in progress, Consuls and Mayor have had to receive authorisations from Paris for themselves before they could be allowed to enter; or rather, before they were allowed to exceed the holiday ramble of country Frenchmen. The Minister of Marine may, of course, on behalf of the Consuls be appealed to by telegraph, and he has uniformly communicated consular authorisations by the same medium. But beyond procuring authorisations for themselves, the Consuls can do nothing. Those desiring authorisations must approach the Minister in Paris through a separate channel. Various reasons are assigned for this stringency at Brest. One is, the bad use which has been said to have frequently been made of the privilege—representing France to be doing things that were not even in contemplation—namely, preparing secret enterprises, for which, by the way, Brest is exceedingly well adapted. Another reason is that the Consuls, who generally have been a long time resident in Brest, entertain the old-fashioned ideas of its importance, which they are continually exaggerating to their governments. The latter of these reasons is the more probable, because it is the case that extremely narrow views of French dockyard matters pervade the consular circles of Brest. The Consuls know Brest, but of Cherbourg, Lorient, and Toulon they are ignorant, and, resolutely holding fast to old opinions, they insist that Brest is the greatest of all the Dockyards, and that, if their Governments want to divine the secrets of the French Government as regards the Navy, they must listen to them exclusively.

Be the reason what it may, it is on the whole injudicious for the Minister of Marine to have taken the course he has. Within the Dockyard there is nothing going on that cannot bear the light of day, and in a state of free entry the misrepresentation of one visitor would assuredly be corrected by the honest statements of another. At present exclusion distorts everything that can be distorted, and, in addition, gives rise to fabrication. What, for example, were the officers of the *St. George*, Prince Alfred's ship, to think when, accompanying the Prince to the Dockyard gate, they were refused admission? The last thing they could think of would be the honesty of the intentions of the French Government, which was then very stoutly insisted on in Parliament and the newspapers. The *St. George's* officers could scarcely help thinking that there must be a screw loose somewhere, otherwise the discourtesy of exclusion would not, under the circumstances, have been practised on them.*

The writer's privilege.

The writer's privilege, as at Cherbourg, passed unquestioned. But there was a trifling formality not thought of at Cherbourg. The authorisation of the Minister of Marine was formally required, and after the transcription of its terms to an official volume, the verification of the writer's signature, as it appeared on the authorisation, followed. So the wrong person would find it anything but an easy matter to get into the Dockyard. Still this formality was redeemed by the courtesy of the Prefect. Leaving some one with whom he was in earnest conversation, he said it afforded him great pleasure to receive a visit from a member of the London press, and that an officer had been ordered to accompany the writer, to afford all the information that he wished and give him access to the armoury, the workshops, and the ships. More the gallant Prefect could not say, and the manner in which he did it was very gratifying. Lieutenant de Vaisseau Emile Esnault was the appointed guide, and this opportunity may be taken of thanking him for the gentlemanly discharge of the duty. The good old Brest Prefecture of Marine, with its tapestry carpets, elegantly stuffed chairs, and handsome moreen curtains, keeps alive old traditions. It does not countenance the innovation of making over its visitors to a *gendarme* as at Cherbourg, or to a sailor as at Lorient and Toulon. Very right; when the privilege of visiting is so much restricted as at present, those who are properly authorised should leave the Prefecture with the kindly feeling that considerate attention seldom fails to carry with it.

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* In justice to Prince Alfred, it must be stated that until he came out of the Dockyard he was unaware of the exclusion of the *St. George's* officers, and that he stated that had the fact of the exclusion been at once made known to him, he would not have entered the Dockyard.

The general plan of the dockyard.

Scarcely any general plan can be said to pervade the Dockyard. Originally the entrance of the creek was the Dockyard, and in times of danger the head of it was sought by ships for safety. At that period the establishment was the simple one of a few blocks on which wood ships were laid down, a few saw-pits excavated by pick and spade, and some rough sheds in which carpenters and others plied their callings. Afterwards, with the increasing importance of the fleet, came enlargements of the Dockyard. Buildings of a more substantial character were substituted for the others, and pushed further up the harbour. So matters went from time to time, new demands on the establishment involving new additions to it, and eventually with a growing coast trade—which had to be provided for because it could not be turned away—the entrance, or lower part of the creek, was assigned to commerce, and the higher portions to the navy. Thus Brest Dockyard, like some of our own Dockyards, has become what it is by a gradual process of accretion. It became a heap, partly of permanent and partly of makeshift additions; the latter originating in war, and the former in the more orderly schemes of peace. Order is now to be brought out of this confusion in that intelligently comprehensive manner that reflects so much credit on the Ministry of Marine, and, by implication, so much scandal on our own Admiralty. What the arrangement of the Dockyard will be eventually it is impossible to say, but no doubt the excellent economic model of Cherbourg will be adhered to,—the putting of things where they are wanted, and by that means dispensing with all the manual labour possible. At present there are smithies and other shops in various corners, but in the neighbourhood of the new works for sawing and dressing timber there are not wanting indications of general workshop consolidation. But for the recent unsatisfactory state of Europe there is reason to believe that a very considerable gutting of the Dockyard would have taken place so as simultaneously to have provided the requisites of iron and wood ship-building, as well as docks of the largest capacity in sufficient number. In matters appertaining to war, however, such a course is, as a rule, impracticable because unsafe; for in the midst of the change war might break out and create embarrassment and other evils. France, therefore, effects changes in a discreet and business manner, although wholesale reconstructions have passed into a parliamentary if not into a household phrase among ourselves, The course of France in adopting rifled guns is a case in point. France made sure that rifled guns were the thing, and instantly set to work to render the cast-iron guns on hand available by rifling, as by such an expedient the fortifications and the fleet might temporarily be supplied in a comparatively short time. The fortifications and the fleet were consequently never for a single moment left unarmed, while both, for a time, would have been so if the change had been effected in the manner of our own reconstructions of the Navy.

The stores.

The workshops and stores of Brest Dockyard have all along had their importance much exaggerated. Neither have been for years, nor are they at present, in the least formidable. No doubt there is a large stock of timber, but a deduction of a half from the quantity generally represented would leave a really close approximation to the truth. The great timber reserve is without, not within the Dockyard, solely with the view of reducing the combustible contents in case of bombardment by an enemy. No formality is requisite for any one who desires to see the stock, and it is deserving of a visit both from the manner in which the logs are treated and secured. Five or six miles from the Dockyard, and towards Landerneau, is the Anse de Kerhuon, a pond two miles in length and half a mile in breadth. All over the pond is studded with rows of piles to which tiers of timber are fastened down, and not only is the actual stock always known by good book-keeping, but matters are so arranged that the longest stored timber is always used first.* And as might be supposed from the good naval administration of the French, what will strike the visitor as much as the orderly withdrawing of the timber is the excellent sluice system of discharging and receiving. Manual labour is economised to the utmost. But granting that the stock of timber in the pond at Kerhuon is on the whole large, of nothing else can it be said that there is any great accumulation. As at Cherbourg, there are few masts and spars, not much rigging, and no excess of sails or cordage. End and means have been closely considered as regards stores, and while for a surprise the supply is adequate, it would be scanty for protracted and exhausting operations. It is perhaps no exaggeration to affirm that in Portsmouth Dockyard there is a greater quantity of general stores than in all the five French Dockyards together. Nevertheless, as at Cherbourg, additions to existing stocks admit of being soon provided, unless in those cases where the market would have to be entered for the purchase of raw material. In the purchase of raw material the French rule is to accept the lowest tender on all occasions; any failure in the conditions by the lowest tenderer securing the contract to the tenderer next in succession. Interest very properly counts for nothing in the matter of supplies for the French Navy, the tender of the struggling tradesman or of the youngest tradesman being on exactly the same footing as that of the oldest or of the millionaire. In England in such matters we are outrageously conservative.*

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* The old navy rule was to make the sailors eat the old beef first, and the consequence was that they never got new beef; it was always old. When the expedition went to Kagosima, the old rule was applied to the vent-pieces of the Armstrong guns,

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and hence the casualties. The Admiralty wanted to get rid of the old vent-pieces before they began on the new. In France they manage those things better. The French sailors always have new beef, and the French guns the new appliances.

* One of the most crying Admiralty abuses is the monopoly of contracts enjoyed by a few firms. The grievance is very much felt, especially in the engine trade, £10,000 being frequently paid in excess of the market price for a single pair of large navy engines.

The fitting and erecting shop.*

The two most important shops in the Dockyard are the sawing sheds just named, and the fitting and erecting stack of buildings on the Recouvrance side, overlooking the Dockyard. These fitting and erecting buildings are of considerable capacity, and will almost, when fully supplied with tools and in complete working order, bear comparison with those of Cherbourg. Lieutenant Esnault regarded them with great pride, and so would any one who had never witnessed better. An imposing range of buildings "consolidates" under one roof, and in departments communicating with one another by archway openings and lines of railway, all that mechanical engineering is in want of for the machinery of ships. You enter the engine-room from which all the machinery of the building receives its motion; from that you pass to a good boiler shop; next to an iron and a brass foundry; then to a pattern shop and forge; and last of all to the great tool departments, where punching, boring, planing, turning, and ever so many other skilled operations are in progress. At present the display is that of a private second-class English engine shop. When fully supplied with tools it will be less than that of a private first-class English engine shop. Nevertheless it will accomplish a great deal. It will be equal to the task of making good the defects of a well-battered fleet, and that accomplished its purpose will be served. The satisfaction of Lieutenant Esnault involuntarily raised the question in one's mind, what, at the Ministry of Marine, are supposed to be the probable engineering requirements of a well-battered fleet? If only that represented by the means to be provided at Brest, then we in England, or rather be it said the Admiralty, have very confused notions on the subject. If Brest will serve all the reasonable purposes of France off Cape Finistene, then Keyham, when stocked with tools, may be presumed to provide adequately for the wants both of our own fleet and the French after an encounter off the Land's End. Very likely this is a question that never received attention at Whitehall, and the Keyham and St. Mary's Island extensions are mere haphazard projects, to be extenuated on the plea of there being no great harm in erring on the side of safety. The French manifestly have settled opinions on the subject, for neither at Lorient nor Rochefort, on the same coast as Brest, can they be said to be prepared for great disasters in machinery. Let us devote a single sentence to this important matter, that the culpable blindness of our administrative system may receive the attention that it merits. In the first place engineering establishments in the French and English Dockyards are not for construction, but merely for repair. What, then, is there to repair under a thoroughly efficient Dockyard system? Vacant benches, cold hearths, unemployed cranes, belts spinning round and turning nothing, answer emphatically in Brest and Cherbourg the suggestive words—very little. What is a steam engine, say of 1,000-horse power? it is an implement of cast and wrought iron weighing not less than 750 tons; well put together one would almost think it would cohere until the crack of doom. But the ship carrying this machine goes into action and is hit several times, or, let it be said, is riddled. How has the machine fared? The chances are that it has not received a single blow: first, because it is well below the water line; and second, because the engine room in all ships is doubly—nay, sometimes trebly secure, being always cut off from the sides of the ship by great wing passages, which are usually full of coal. All this the Admiralty seem blind to, and the French appear to be alive to. The French provide for trivial engineering casualties, which is reasonable; we provide for great engineering casualties, which are improbable. By and by it will be seen that the French and we differ in another important particular; they providing for enormous hull casualties, which are to be met by docks and basins, while we are only yet beginning to think of such casualties and the means of making good again.

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* The armoury in Brest Dockyard is not on a large scale, but turns out all sorts of weapons. Its extinction has been determined on in the course of the reconstruction, an armoury in a Dockyard being long out of date. No doubt other manufacturing establishments will be weeded out for the same reason.

The woodwork shop.

The woodwork shop is on the Brest side of the Dockyard; almost opposite to the fitting and erecting shop. The convenience of the arrangement is obvious, because if wood ships are to be continued in construction for the service their machinery is fitting directly across the creek. If, on the other hand, iron ships are to be the favourites of future times, they may be laid down either on the Recouvrance or the Brest side, rather higher up, which will be convenient for the backing, the deck plank, and the woodwork of the storerooms. Labour in either case will be economised to the very utmost. But it was remarked that symptoms of consolidation are apparent about the woodwork shop. Yes; as on the other side of the creek the whole engineering work is being grouped, so on the Brest side all the woodwork shops of the Dockyard appears to be on the point of being got together. Already much has been done in entirely new premises. There are sets of the Havre sawing machines, dealing with ponderous logs in the same fashion as McCormack's American reaper deals with a field of Kent or Essex wheat. Even logs are sawn into crooked shapes of any pattern, with no apparent effort on the part of the man guiding the ingenious implement, and crooked logs are as easily sawn straight. Brest is ahead of Cherbourg in this respect, as it ought to be, it being the second construction port. But mere sawing is not all that is going on. Beyond the sawing machines, but under the same roof, most of the operations of carpenters and joiners are performed by machines, some of which are the invention of our ready Transatlantic cousins. And as labourers are still clearing away rock for extensions in the same direction, the presumption is that the day of all the scattered, shabby wood workshops is hastening to an end. The bringing together of the wood workshops and the bringing together of the erecting shops practically amount to a Dockyard enlargement of a few acres. Why do not the British Admiralty think of extensions in a like direction, those, namely, of compactness and consolidation?

The other shops.

Of the other shops very little need be said. They as yet remain unchanged. The ropery is as it was twenty—nay, fifty years ago. So is it with the sail loft, the mast houses, the boat houses, and other minor places. Into the forge one or two steam hammers have been introduced, but the rows of blacksmiths' hearths are exactly as they were long ago. So the forge is likely to remain until the Ministry of Marine is made over to unwise or feeble hands. Then iron manufacturing innovation may be thought of, and the blacksmiths' hearths set round, or space found for them in the corners of a great factory for rolling armour-plates, angle and bar iron, and sheet iron. But common sense just now prevails. France is not ambitious to compete with private industry in such things, or indeed in anything; but, on the contrary, is ambitious to develop private industry to the greatest possible extent. Indeed, it may be almost said that iron manufacture will never be attempted in a French Dockyard. The time was when other opinions found acceptance. The time was when a great engine-building establishment was set agoing by Louis Philippe, but experience has proved that if good engines are ever to be provided for the French Navy, they must be the work of private firms. Not one of the engines of a French iron-clad has been built at Indret, and the officers of the iron-clad fleet rejoice at the fact, as well they may. When Englishmen arrive at the same conclusion as regards Government competition with private industry, the abatement of a penny, if not of twopence, from the income-tax may at once be counted on.

The basins, docks, and slips.

Of basins Brest as yet has none, and possibly it may never have, the entire creek forming one great basin. All along the quay, both on the Brest and Recouvrance side, ships of all classes may lie and have their wants attended to. When the bottoms require attention the docks are of course available; and no doubt eventually the slips will be so too, as at Cherbourg. What the number of docks and slips will be when the Dockyard is finished necessarily remains unknown to all outsiders, but, judging by the blasting clearances which are in progress, a considerable increase in number is in contemplation. At present there are two docks, which originally were some 220 feet in length by some 60 feet in breadth; both have been recently enlarged. Then there were two double docks, each 500 feet in length by 60 feet in breadth;

those are still unchanged. In addition, one first-class dock has been some time in progress, and the excavation being finished, it, if hastened, might easily receive ships before the end of the present year. But, just now, the work proceeds with great exactness and deliberation. On the rock-bed of the dock a floor of massive granite blocks is in course of laying down, and the sides and quays will be built in the same manner. It is worthy of remark that those docks are all on the Recouvrance side, and very near the erecting and other shops—a circumstance still proving that, whatever the jumble of shops and docks in our Dockyards, method is the motto of the French. Their docks are where they will be wanted; like all other things, they are beside the workmen; and the consequence is that stragglers are seldom met with in a French Dockyard. The present number of building slips is eight of the first class and four of the second class. No doubt the number will be doubled, and while the wood building slips are kept on the Brest side, those for iron building will be established on the Recouvrance side.

The Ships in construction.

The ships in construction at the present time are not many. No new ironclads are laying down, and none have been laid down for some time. Three, the *Magnanime*, the *Valeureuse*, and the *Gauloise*, are in an advanced condition, and substantially they are ships of the Gloire class. The state of those ships afforded an excellent opportunity of observing how the French wood ironclads are built. On the frame inside there is diagonal planking, and on the frame outside there is longitudinal planking. In addition, on the inside diagonal planking there is longitudinal planking; in all, three thicknesses of planking, exceedingly well fastened on solid or filled timbers. A stronger job is impossible, and the Brest Dockyard officers are surprised that the strength should ever have been questioned in England. In their gentlemanly way they affirm that the French wood ships are incomparably better put together than our own. And they even go beyond that, and affirm, that however strong our wood ships may be before the armour-plates are put on, they are ruined by the mode of armour fastening to which we adhere.* A French ship's side, they say, is a yielding shot-resisting structure; ours, a rigid structure that may be crushed or smashed in with little trouble. And they are not slow in assigning reasons. First of all, they say that our armour-plates are through bolted, tightly screwed to the ship's side, and as shot will always make an indentation, and indentations always make a bulge behind, so it follows that the rigidity of through bolting is the weakest and most absurd contrivance possible. That is their first reason; and it amounts to accounting for the effect. Then they turn to experiment, and tell you that the French Government have experimentally proved that through bolting rigidity is a mistake. What, then, is their system? Instead of a through-bolt system, it is one of ordinary screwing; a mere hanging of the armour-plates by screws, which do not pass entirely through the thicknesses of wood, but enter them sufficiently to retain the plate. These plates so hung, receive the impact of the shot. There is said to be a threefold effect: first, a severe blow is more or less distributed over the whole surface; second, the armour-plate is not displaced but more firmly attached to the wood than before; and third, the bulge behind is reduced to a minimum. Further, there is no hope of knocking off a plate, batter it as you may, the bolts being of a quality that may bend or twist but will never break. Of the quality of the bolts the writer can speak from personal observation, as he had the pleasure of witnessing attempts to break them. It is unaccountable that although the French Government long ago tried, and discarded, our system of bolts and fastening, neither the War Office, the Admiralty, nor the Iron Plate Committee ever thought of trying the French system at Shoeburyness or Portsmouth. Not one French iron-clad, whether ship or battery, built or building, has its armour-plates attached like ours.

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* There can be no doubt at least that there is inherent weakness in the bottoms of the *Royal Sovereign*, the *Prince Consort*, *Caledonia*, *Ocean*, *Royal Alfred*, *Royal Oak*, &c., those ships having been designed to carry wood plank, and having been required to carry armour-plates. The French have not committed this blunder. Not one of the French ironclads was originally designed for wood-planking, but all were designed for armour-plates with increased displacement.

The Sailors' Barracks. Sailors' barracks entered early into the economy of the French Dockyards, and nowhere are there better barracks than at Brest, although those of Brest were built many years ago. In the Brest sailors' barracks there is a permanent reserve of 3,000 seamen, having nothing whatever to do with the ships in the port or roads. They are a stand-by for emergencies, and deemed sufficient for the manning of a fleet of transports bearing a body of not less than 60,000 troops; or, with such raw hands as could be picked up on the instant, they are deemed sufficient for the satisfactory manning of ten line-of-battle ships. And the force has another use—that, namely, of filling newly commissioned ships, or of providing supernumeraries for distant stations. The places of those withdrawn from the barracks are of course at once filled. Such are the purposes of the sailors' barracks. France, at an early period, discovered the advantages of being ready to engage in near or distant enterprises, and as it had often suffered from placing unseasoned landsmen on board its ships, barracks were provided. Within the barracks sailors do not rust, and if they may be said to drill always, they are at least well cared for. Rude comfort pervades the barracks, and as Frenchmen are by nature sprightly, dulness finds no place. Unlike the gloomy denizens of Greenwich Hospital, they in their leisure gloat over the light literature of the Paris publishers, and neither Bibles, Prayer-books, nor earnest calls of any kind are thrust upon them or cross their path.* Then there are the reliefs; change from the soldier in the barracks to the sailor in the second-class reserve ships, or to the school-ship gunner in the roads and Bay of Biscay. Pleasant bracing changes these; and, let it be repeated, the spirit of the men is always excellent. But it will be said the get-up of the French sailor is inferior to that of the English sailor. This is true to a limited extent only. Netted in by the conscription maritime, as fish are in a trawl net off Yarmouth, there are stiff-jointed, stiff-backed, round-shouldered, knock-kneed, bad-footed, and seesawing fellows not a few; but as the great bulk of mankind are passable in most if not in all respects, there are to be found in the Brest barracks many of the finest specimens of the sailor that will be seen afloat. And let it never be forgotten that the ugliest and stiffest-backed fellow going may lay a gun or sponge a gun with the most feminine-faced and agile. Nor let it either be forgotten that steamships will fight with their canvas stowed, and active and slow seamen, not on duty at the guns, will stand helplessly together in the friendly shelter of the broadside merlion while the fight proceeds.

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* The religiously disposed are perhaps not aware that a sad use is made of Bibles and Prayer-books in Greenwich Hospital.

The School-ship system.*

The school-ship system, an affair of yesterday among ourselves, is, strange to state, of mature growth in France. More than five-and-twenty years ago, the *Abondance* was in Brest roads with a full complement of cabin-boys, 250 in number. Since then the system has grown apace, until the leading seamen on board most French ships of war will be found to have been to the manner born. This, so far, would admittedly be a great deal even if it went no farther. But there it has not stopped. The fine fellows that you meet with on board a French ship of war have all profited by association with those bred to the service, and among their number a sprinkling of those who were in their day school-ship youngsters will be always found. During the Russian war the system received the great development that it has now attained. At that time a great school-ship barracks was founded in Brest, without the training-ship organisation being at all disturbed. The erection of the school-ship barracks was pushed forward rapidly, and the barracks soon opened to all the well-recommended boys in the department. Its success has exceeded all anticipation. Capacious as it is, the demands on it are constantly in excess of its ability to receive. And so catholic is its management that no public institution can possess better founded claims to popularity. The Consuls in Brest have the same right to recommend as the French authorities, and to all celebrations the Consuls are invited by the Prefect Maritime. In a word, in the school-ship barracks all classes, French and alien, are led to take a warm interest. And the boys are as comfortable and happy as the sailors. In the barracks the boys divide their time between school and soldier's drill and play. Then comes the turn on board ship, and the turn again to the barracks. So it continues, or rather has continued, until between the school-ships and the school barracks, the waste by death in the whole French navy is all but made good annually by drafts of well-educated, trained, and disciplined boys. This is a great result—one that must startle those who have thought anything of naval matters. Before long the seamen of the French navy promise to be the best in Europe. France, of course, is not to blame for it, but on the contrary is to be commended for the resolute manner in which it has dealt with a great difficulty. Half as much well-directed zeal by the British Admiralty would long since have divested the truly formidable organisation of all its terrors.

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* M. Dupuy de Lome the other day, in the *Corps Législatif*, laid as much stress on the French school-ship system as any Lord of the Admiralty ever did in Parliament. The French school-ships are one of the great sources of supply for the navy.

The Gunnery Ship.

The gunnery ship *Louis Quatorze*, attached to Brest Dockyard as the *Montebello* is attached to Toulon Dockyard, is the appointed receptacle for all trained gunners in their turn. On board the *Louis Quatorze* the theory of the Dockyard gunnery schools is put in practice, and the ship being an old-fashioned full-rigged three-decker, propelled by wind and not by steam, the seamanship of the gunners is thoroughly rubbed up at the same time. Six hundred gunners are the service complement of the *Louis Quatorze*, and away the ship goes with them. For days together she will tack in Brest roads, that the gunners may be reminded of the working of a ship; then for days together she will manœuvre outside Cape Finisterre, that officers and gunners may know the scarcely less important branch of duty. At last a half or whole gale of wind is picked up, and all hands are piped to quarters. There is an enemy on the lee or weather bow, and it is imperative that he should be overhauled and engaged. This enemy may be imaginary, or a veritable Frenchman, hove to, if not making in or out of port. The *Louis Quatorze* accepts the occasion, all on board are at their stations, and fire is opened as rapidly as the guns are brought to bear. It is an arduous duty, but one from which no gunner shrinks. Pitch goes the *Louis Quatorze*, roll goes the *Louis Quatorze*, splash and gurgle enters the blue sea at the open ports, drenching the gunners, but boom rattles the heavy broadside. So half a day is spent, and the gunners are piped to dinner after the ship's course has been laid for Brest roads. Practice such as this will warm the blood of old naval officers, but the story is as yet half told. Not a gun was fired before the elevation, and the right or left training, was given by superior order. Of random firing there is none now-a-days in the French gunnery ships, or in the French navy. The officer of the deck fires every gun. By a succession of touches, and with the alacrity of thought, he communicates with the decks, not in a lump, but in sections, expressing in bold characters the deflection and depression of every round. Cumbrous, dilatory, and impracticable as the system may appear by reading, it is admirable, and, as an enemy will feel, it is deadly. Upon an enemy there will be fearful concentration and precision. Smoke between decks, and the excitement incident to the running out and recoil of guns, will hereafter fail to compromise the honour of the French. French ships of war will be fought by rule; the rule of officers directing from the deck, and of gunners acquiring the ready habit of laying the guns as they are ordered. On board all the French ironclads the laying of the guns is directed from the armoured pilot-houses, from which the ships are also steered; on board the *Louis Quatorze* and the *Montebello* there are of course no armoured pilot-houses, but the system is the same. Six hundred gunners on board the *Louis Quatorze*, and six hundred gunners on board the *Montebello*, is an aggregate of twelve hundred gunners in continual training at this precision firing, at this manœuvring, and at this seamanship. And this has been going on for years. From the gunnery schools in the Dockyards seamen have been taking their turns on board the gunnery ships, until the seamen of the fleet have been transformed into perfect gunners and perfect seamen. What are we doing, and what have we been doing, while France is so employed? We have the *Excellent* and the *Cambridge* with a lesser number of men in training than are on board the *Louis Quatorze* and the *Montebello;* and the *Excellent* and the *Cambridge* do not go to sea. Gunnery in the British Navy is, therefore, as yet in the theoretic stage.* All that takes place on board our two gunnery ships takes place in the gunnery shed at Shoeburyness, and takes place in the gunnery sheds attached to the French Dockyards. France, therefore, has stolen a march on us. However well the *Excellent* and *Cambridge* gunners may fire in smooth water, they know nothing of firing in troubled water. This is sad; perhaps some day it will be thought criminal. Then, while French ships will be fought by rigorous scientific rule, British ships will be fought by rule of thumb. British naval gunners must do the best they can without scientific supervision. This is scarcely less melancholy. Then, last of all, while French gunners are taught manœuvring, British gunners are not. Manœuvring has long been tabooed in the Royal Navy: by its skilful exercise naval actions will always be determined. So difficult a thing is manœuvring to master, that, as observed before, in Admiral Penaud's experimental squadron the *Normandie* alone maintained the order of sailing on one occasion. Some naval officers will answer that the manœuvring of Nelson, that, namely, of laying your ship alongside of the enemy, will answer every purpose. Then why did not the *Kersage* lie alongside the *Alabama?* With good handling and a single 10.5-inch Armstrong gun, the *Alabama* would have sunk the *Kersage* with the first fair round.

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* Some thirty rounds per gun are served out annually in the British Navy for practice. In most ships it is never fired away; so much is real gunnery disregarded by naval officers and the Admiralty.

## CHAPTER IV.

## LORIENT.

A Natural Dockyard.[*]

Lorient,[†] like Brest, is a natural Dockyard: as a port of war it ranks third, and as a construction port it is the first in France. Entering from the Bay of Biscay the commodious estuary formed by the Scorff and Blavet, which constitutes Lorient roads, little more than half-an-hour's steaming brings you to the junction of the two rivers, flowing almost at right angles. On the projecting land between the two rivers stands Lorient, the Blavet to the right, forming the Dockyard, and the Scorff to the left, forming the commercial harbour. The place, altogether, has an old-fashioned look, being exactly the reverse of what a modern Dockyard should be. On the extreme point of land

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[*] Pembroke is the proper English offset to the French Lorient, and the most-out-of the-way and indefensible of all the Dockyards. There would be quite as much sense in building ships in the Orkney Islands, and a great deal more sense in building them in Cork or Belfast, Newcastle or Glasgow. Pembroke is exclusively a construction Dockyard, and as such it is superfluous. At one time there may have been cogent reasons for such an establishment, but cogency is now altogether on the other side. The establishment, like that of Deptford, should forthwith be brought under the notice of enterprising promoters of joint-stock companies by the Secretary of the Admiralty. In Pembroke Dockyard there is one dry dock, four first-class building slips, and nine second-class building slips.

[†] On the subject of the spelling of Lorient it may be well to quote the following from the letter of a resident friend. He says, "Will you kindly permit me to make an observation on an error as to spelling the name Lorient, which they (the English) spell L'Orient, depending on grammar. When first built by the French East India Company, it was christened L'Orient (the East), but when taken from the company and made a Government arsenal, its name was made Lorient, and it is so written in all Government documents and in all the French newspapers. In short, Lorient is now the name of the place, and not L'Orient."

between the two rivers, and directly facing you—the most eligible site for a first-class fort with batteries, a *fleur d'eau*—stands the barracks. To be sure, there is this sense in the arrangement, that, in case of attack, the soldiers and sailors leaving the barracks, an immense mass of brick and mortar would interpose between the enemy and the Dockyard stores; but now-a-days comparatively light guns, firing common or segment shell, would very soon transform the buildings into a heap of ruins. In other days it was otherwise: then the barracks did good service. Then there were no rifled guns and none of the destructive projectiles of the present time. That Lorient, as it faces the roads, is as it was fifty or a hundred years ago, is a fact of some significance. The significance is, that if France were spending treasure on its first port of war, Cherbourg, and on its fourth port of war, Toulon, it was at least idle or remiss in the Bay of Biscay. This may either show that, notwithstanding the long-imputed warlike purposes of France, war has not really been in contemplation; or that France, by this neglect, manifests deep-seated hostility to England, inasmuch as for years past all its energies have been directed to the completion of those works at Cherbourg and Toulon, which are alone essential to safe hostility against this country. A point so knotty need not be solved in this place. Suffice it to state that the natural advantages of the Scorff and the Blavet are at length recognised, and that great works are in progress.

The Sea Approaches.

The sea approaches of Lorient Dockyard are well covered, and recently there has been manifested a disposition to mount cannon of the largest calibre on the works. The other day the Government foundry at Ruelle turned out a 10-inch gun weighing fourteen tons* for that purpose, and it is believed that the

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* It has been stated already in a previous note that the French Government have contracted, or are at the present time contracting, for 10-inch guns or 300-pounders in this country. The other day at Shoeburyness, namely on the 17th June, 1864, there was an important trial of rival 300-pounders—the 10·5-inch Armstrong shunt 300-pounder proper; and the 9·22-inch Woolwich shunt 300-pounder, the experimental gun of the Ordnance Select Committee. The point between the two guns was whether the small or the large bore effected the greater penetration. Success was clearly on the side of the large bore; a fact, the writer believes, that has since been confirmed by the committee. At the same time the question of bores was tried with 100-pounders, the 9·22-inch Somerset, and the 7-inch Frederick, the Somerset effecting the greater penetration. These two last guns were both of Armstrong construction, of the same weight, 6½ tons, of the shunt rifling, fired with the same weight of shot and with the same charges. The target fired at was the Lord Warden, the official particulars and programme of which may as well be given in this place. The Lord Warden corresponds to some extent with the construction of the *Couronne*, referred to in the previous chapter, and the general result of the firing was that the target was completely riddled. The Armstrong 300-pounder put its shot through the target as easily as it would have done through the *Warrior*, but with terrible effect as regards hole and splinters, the splinters being such as would have disabled every one on the deck, and the hole being such that plugging or stopping would have been impossible. Had the common shell of the Armstrong 300-pounder been fired at the target (it is much to be regretted that it was not) there is little doubt that it would have been set on fire, as a shell from the 9·22 light Somerset gun with the small bursting charge of 7lb. required the application of a couple of pails of water on the target. The following is a transcript of the official programme. In the order of firing there were some trifling alterations and substitutions:—

ORDNANCE SELECT COMMITTEE & SPECIAL COMMITTEE ON IRON.

*Programme of Experiments to be carried on at Shoeburyness on the 17th June, 1864.*

Lord Warden Target, No. 22, Minute 11,618.

The target, 20ft. × 9ft., represents the ordinary construction of a wooden ship armour-plated, with the addition of an iron skin worked outside of the frame timbers of the ship.

The following are the scantlings: Frame timbers moulded, 12½ inches; iron diagonal riders connecting the frame timbers, 6in. × 1¼ in.; inner planking, 8 inches thick; iron skin, 1½ inches thick; outside planking, 10 inches thick; rolled armour-plates 4½ inches thick, manufactured by the Millwall Company, 20ft. × 4ft. 6in.

Armour-plate bolts 2 inches in diameter.

Deck beams, lower 15 inches by 12 inches.
" upper 16 " 16 " Deck planking, lower ... ... 4 inches.
Waterway, lower 15 " 15 " " upper ... ... 4 "
" upper 14 " 13 "

Iron knees to each beam—weight 3cwt. 2qrs. 21lb.

The total weight of the target is 38tons, 16cwt. 0qrs. 13lb.

Range 200 yards.

| Top Plate. | Charge. |
|---|---|
| 1. Service 68 pr. gun, steel shot ... ... ... ... | 16 lb. |
| 2. Light 9·22 inch gun, R, steel round shot ... ... | 25 " |
| 3. 150 pr. gun (10·5 inch R), steel round shot ... ... | 50 " |

trials of the gun at the Polygon of Savre, near Lorient, were perfectly satisfactory, the result being that a target representing a section of the side of the strongest iron-clad afloat or in contemplation in France or elsewhere was destroyed by a few rounds at 1,000 yards. That is one of the earliest French guns of a diameter exceeding eight inches, the whole energies of France having been directed hitherto to the practical task of rifling old guns for its ships and fortifications, leaving to ourselves, and especially to the Americans, to work out the big gun problem. The presumption is that Lorient will be defended by 10-inch guns, and that as those guns are delivered they will take the place of the rifled 32-pounders at present in the embrasures. With such guns it is easy to foresee that a position less favourable for defence than Lorient would practically be impregnable. Better at least than Sheerness ever can protect the river Thames, Port Louis always will command the entrance of the Blavet. At the present time not fewer than five hundred guns may be trained on any passing enemy, and before long the number bids fair to be more than

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| | Top Plate. | Charge. |
|---|---|---|
| 4. | Heavy 9·22 inch gun (R), steel shot, 220 lb. ... ... | 44 lb. |
| 5. | Light " " steel shell, 171 lb. (a) ... | 25 " |
| 6. | 7 inch M. L. gun (R), steel shot ... ... ... ... | 25 " |
| | **Lower Plate.** | |
| 7. | 68 pr. gun, steel shot ... ... ... ... ... | 16 " |
| 8. | 150 pr. gun (10·5 inch R), steel round shot ... ... | (b) 35 " |
| 9. | 10·5 inch gun, R, elongated steel shot ... ... ... | 45 " |
| 10. | Heavy 9·22 inch gun, R, steel shot, 220 lb. ... ... | (b) 35 " |
| 11. | Light 9·22 inch gun, (R), steel shell, 171 lb. (a) ... | 25 " |
| 12. | 7 inch M. L. gun (R), steel shot ... ... ... ... | 25 " |

(a) Weight of shell empty. These shells may be fired from either the light or heavy 9·22 inch gun.

(b) These reduced charges to be employed if the shot with full charges have penetrated.

The Committee have arranged to ascertain the velocities on impact of the above projectiles by means of Navez's electroballistic apparatus.

The exact order of the firing will be arranged with Major-General Taylor and the Special Committee on Iron.

doubled. Indeed, the enlargement of Lorient Dockyard will practically extend to Port Louis, and it is said to be in contemplation to line the river-side with batteries *à fleur d'eau* such as those at Toulon.

The Land Approaches. Lorient being in Brittany, like Brest, all that was before said of population and cereal produce again applies. The Bretons of Lorient are the same hardy and intrepid race, and the Lorient husbandmen have the same small holdings as those farther north. But towards the Loire the country is flatter, and if Brest might succumb to an army in the field, Lorient would be a comparatively easy victory. Where the railway sets down the traveller just outside the town there is not even a surface undulation, and much of the adjacent coast is low-lying and accessible for landing. No enemy is, however, likely to venture there unless with ships, nor at any other French Dockyard, and our own Dockyards are likely to enjoy the same immunity, for what Government in their senses would ever think of an army on a French or English coast? The permanent fortifications round the French Dockyards, apart from the works on the heights where there are heights, and with exclusive reference to a land attack, must in these days of great guns and projectiles be taken as defences against a mob or revolution when the assailants are unprovided with proper arms. What the permanent fortifications round our own Dockyards are now good for, it is impossible to say. Neither against mob nor revolution is it in England wise to guard and fortify, and we may be sure that no sea works of any kind will ever spare us from humiliation if through routine or incompetence we deserve to be humiliated. Lorient is in direct communication with Paris by railway, its coal from the home or Belgian coalfields, at a price and may therefore draw not exceeding a pound a ton. In Lorient the writer met an English coal traveller making the round of tradesmen buyers in large or small cargoes.

The Harbour. As the Blavet from Port Louis upwards to where the railway bridge crosses at the head of the Dockyard will be the Lorient harbour of the future, it may be as well spoken of in anticipation. The Blavet is such another river as the low-water Thames at Greenwich. In fact, it is just another creek such as that which forms Brest Harbour. There is the same depth of water, the same tide, and pretty much the same windings. Once in the river, ships may let go their anchor, and once in the harbour proper, they may make fast to the shore. Such a harbour possesses an obvious advantage over that of Cherbourg, which must not be overlooked. In a winding channel of some length and inconsiderable breadth every foot of ground admits of being fought, while in an artificial harbour where there is a more or less wide and always short channel, once the batteries are passed or silenced, the attack has succeeded and the defence failed. In the narrow channel, your ships, with a spring on their bow or stern, would sweep the ports and decks of advancing ships at every round, and were the enemy even iron-clad, what hope would he ever have of surviving a single round of 10-inch shot or shell? None whatever. And let it further be observed that for the protection of such a harbour as that of Lorient costly ships are not needed. The oldest hulks will do the work, but of course less satisfactorily than the formidable iron-clad batteries which are now in hand at Nantes and Bordeaux.

Those batteries, as will appear hereafter, are the most formidable that have yet been built, and what is scarcely less important, they are built under circumstances which demand attention.

The Town.

The town has a pleasant look, standing as it does on a narrow ridge the base of which is washed by the Scorff, while the foreground is filled out with the commercial harbour and the roads. And there are some really good houses, at least for that humid part of France. When, however, you ascend the rising ground to the market-place and chief thoroughfares, and make the descent at the other side, the ordure of the streets and the reeking houses of the working classes give rise to uneasy as well as painful feelings. In this quarter of the town, and in one of its most obscure corners, the frail licensed sisterhood are congregated. The indications are various: unusually large numbers to the houses, closed shutters, or oil lamps suspended by a rope across the street. Let those who approve the system of control inquire into the condition of those places in Lorient or any other French dockyard town, and instead of afterwards commending, his better nature will be outraged. Man there descends to the level of the brutes that perish. Woman there is divested of personal control or shame. The vilest women of our streets and slums are chaste and noble in comparison. By all means let our soldiers and sailors be kept from the vilest corners of pollution at Woolwich and elsewhere, but never let us think of descending to the low French level. Nothing assuredly has tended half so much to blunt the modesty of the French and German mind as the regulation and licence of immoral houses. This at least is the all but universal opinion of thoughtful Frenchmen; and let those, therefore, who would try to controvert the statement first know what they write about. Theoretically it is a fine thing to dispose of social evil on the French and German plan, but practically the remedy works less good than evil. True, you secure fewer infected seamen and marines on board a French than on board an English ship of war; but the secrecy and sense of security diffused among all classes by licensing, and the debasing estimate of human nature that becomes so prevalent, are evils of the gravest magnitude.

Access to the Dockyard.

Few Englishmen have ever cared to visit Lorient, and probably that has more or less to do with the unwillingness of the Prefects to grant permission to see the Dockyard. Unless armed with the authority of the Minister of Marine, it will generally be found impossible to obtain more than a polite refusal. The writer was received in the most friendly manner, and at the Prefecture the visit to the Dockyard was preceded by an interchange of news on naval subjects, one point on the Lorient side being sufficiently important to bear reproduction here. At Lorient—the first construction port of France, be it remembered—opinion is strongly, nay, altogether, on the side of iron ships. The gallant officer acting for the Admiral—the latter being sick at the time—gave it as his opinion that the days of wood ships had irrevocably gone by. "They are," he said, "weak, troublesome, and costly to repair, troublesome and costly to build, and in a perpetual course of decay. Whereas," he continued, "iron ships are exactly the reverse. True," he added, "their bottoms foul, but that embraces all that can be said against them, and for that you in England and we in France are abundantly provided, first in docks, and next in scrapers and scrubbers."* This is important testimony from the Dockyard where the *Couronne* and the *Heroine* were built, and where iron transports and other iron craft are at the present time in hand. Mr. Scott Russell never went farther, probably never so far, because

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* The question of the fouling of bottoms is almost as hopelessly involved as the question of rival guns. Interested representations, or rather misrepresentations, are of course at the bottom of it. What is true is that wood ships without copper on their bottoms are of no use at all in warm latitudes, and that there are many old iron ships in the tropics the bottoms of which have stood no end of scraping, red paint or composition being merely applied from time to time. Instead, therefore, of bottom-fouling being a good objection to iron ships, and especially to iron-armoured ships, as distinguished from ironclad ships, the necessity for the use of copper on the bottoms of wood ships ought really to lead to the peremptory discontinuance of wood shipbuilding, at least for the navy. With this preface the following extracts will be interesting, as showing both sides of the question:—

"I should think the Admiralty will have had enough of their copper-recommending chemist by this time. Where was he when the *Royal Oak* was coppering in dock at Chatham?—the veriest tyro in chemistry must have foreseen the consequences of this stupid act. It has been an established fact for *ages* that copper will destroy iron in salt water. What more common in a large ship of war than to find the launch, the biggest and heaviest boat in the ship, falling in the water whilst being hoisted by the yard and stay tackles, or on deck, as the case may be, and killing or wounding men, owing to the *iron* ringbolts at the bow and stern being clinched through the keel *over* the *copper* sheathing on her bottom. The bolt is examined, found to be eaten away at the clinch to the size of a wire, and *ergo* renewed and re-clinched over the copper sheathing as before, until it occurs again, and nobody *guesses* the *cause* beyond natural decay, although the fact was patent in our Dockyards to the nation's cost some ninety years ago by coppering ships over iron fastenings, after which *copper* fastenings were used, and have continued in the navy to the present day."—*Letter to the Writer.*

"A curious phenomenon has been disclosed in the state of the iron-plating of the *Royal Oak*, 35 guns. This ship, which was launched in March last, was then placed in dock, and came out in May; since which time she has been afloat. The *Royal Oak* was designed for a first-class line-of-battle ship, but was cut down and iron-plated. She is thus a wooden-built ship, covered with plates of iron. On being taken into the dry dock at Keyham, her iron plating was inspected and found defective.

"The lowest tier or layer of her iron plates, which is painted with red lead or some composition, is all more or less honeycombed, and partially destroyed by galvanic action, arising from contact or proximity to the copper sheathing below. Where the corrosion has set in, pieces of the injured iron can be picked out with the point of a penknife. The tiers of plates on each side of iron-cased ships are usually similar in size. The lowest tier on the starboard side of the *Royal Oak* consists of 19 plates; each plate is about 15 ft. long, 3 ft. 2 in. deep, and 4½ in. thick. Commencing at the bow, the first plate has 72 holes or pits in it, varying in depth from a quarter to half an inch; the second, 40 holes, ¼ to ⅝; third, 60 holes, ⅛ to ½; fourth, 94, ⅜ to ⅝ (the ⅝ in this plate being very close to the copper); fifth, 66, ⅛ to ¼; sixth, 109, ¼ to ⅝; seventh, 168; eighth, 115; ninth, 188; tenth, 220; eleventh, 176; fourteenth, 122 holes, &c: *Wherever the least abrasion or friction has taken place and the red lead or composition has been rubbed off from the surface of the plates, galvanic action has been in full force.* This is remarkably evident in one part—the hook, several feet long, which keeps the accommodation ladder in its place, is fastened to the ship's side by an eyebolt; when all expedients for coppering iron bottoms over layers of wood are scouted in Lorient as idle and unnecessary. Lorient desires iron ships pure and simple. But the wood ship men are not yet all dead in France. They survive, and are as prejudiced and inaccessible to reason as the class in England. They disapprove of iron ships —because iron ships are not built of wood. An enlightened view is taken in Lorient of this weak-minded logic. It is said that this antipathy is an inseparable condition of progress, be the purpose or direction what it may, and that it must be taken as such. It is an antagonism which in time will wear itself out, and then

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not in use the end drops below the level of the sea, between plates 11 and 12; it has been allowed to sway about fore and aft, and has thus worked off the composition, and the action of the copper has in consequence had full effect here; a portion of a circular groove exists in each iron plate, each portion being 2ft. 6in. long in the sweep, and about three-eighths of an inch in depth. In some places, just at the junction of the iron with the sheathing, the edges of the iron plates are corroded for lengths of six inches to a foot, and in one place, under the quarter, this kind of corrosion extends to a length of 10ft. Between the iron plates and the copper sheathing there is a band 1¼in. deep, apparently of lead, but said to be brass or some metal of a similar colour, which is covered with thin copper."—*Times*, 28th October, 1863.

"DESTRUCTION OF IRON SHIPS BY GALVANIC ACTION INDUCED BY PREPARATIONS OF COPPER.—The French floating battery *La Gloire* has lately been examined, and found to be seriously injured by the action of copper on her iron plates, the whole of which, below the water-line, will have to be removed, being converted into a kind of plumbago by galvanic action. We had occasion, some time since, to call attention to the extraordinary state of her Majesty's ships *Triton* and *Sharpshooter*. On their being docked for examination, the iron plates were in some places reduced to the thickness of writing-paper, and in the case of the *Triton* the scrapers actually went through the plates when removing the tons of oysters, barnacles, &c. attached to her bottom. It appears that this ship had been coated with a preparation of copper, and the destruction of the plates and rivets arose from galvanic action on the exposed surface of the iron where the under-coating had become rubbed off under the bows and forefoot and along the light-load water-line. The salvation of this ship from foundering was, no doubt, occasioned by the adhesion of the shell-fish. She has just been thoroughly repaired at Devonport Dockyard, and is now coated with Messrs. Peacock and Buchan's preparation, which is superseding the copper preparations hitherto used in her Majesty's Dockyards."—*Shipping Gazette.*

"The paddle-wheel steam-vessel *Triton*, 6, at Devonport, having been thoroughly repaired, rigged, and stored, is now nearly ready for the first division of the steam reserve. This is the ship the iron plates of which were reduced to the thickness of paper by galvanic action, induced by the vessel having been coated with a preparation of copper. She is now covered outside with the composition of Peacock and Buchan." —*Times*, 22nd December, 1862.

even the present opponents of iron ships will swell at shipowners' dinner-parties or elsewhere the chorus of complacent thankfulness and congratulation because of the astonishing shrewdness of those living in the latter part of this marvellous nineteenth century. So, taking Lorient to represent French opinion, wood shipbuilding in France hereafter will not show that wood is liked and iron disliked, but merely that France is working up material. It will show also either or both, in case France continues to receive contract timber, that timber contracts cannot be annulled, or that in the absence of docks on foreign stations in which iron ships could get their bottoms scraped, it would be expedient to continue the use of wood ships for foreign stations. There is, however, another view of the iron ship question forcibly brought to the writer's mind, in France and at home, not on one occasion, but very often. Let men, either officers or workmen, who have been accustomed to wood shipbuilding, be forced by circumstances to take to iron shipbuilding—very much against their will—and it is astonishing how soon their prejudices melt away. Insensibly and step by step they become converts, and eventually, in nine cases out of ten, coolly turn round and tell you that they were always for iron and against wood.

The general Plan of the Dockyard.

The general plan of Lorient Dockyard will in its completed state be perfect in its way. Entering the roads, you have on the right the new extension stretching from Port Louis onwards to the Blavet. Reclamation is also proceeding on the left. Between the new defensive works you may have as many basins as you choose, or none at all. Opposite the town, on the Blavet, you may have a mile of first-class building slips, with all the rear space requisite for shops. One half of this building slip frontage and rear space is convertible into an iron ship department; the other half into a wood ship department. Or the whole south bank of the Blavet may become the iron ship department of the Dockyard. The town side of the Dockyard, the present site of shops, stores, docks, and other things, may remain as it is, with little more change than the substitution of strong defensive works for the barracks at the junction of the Scorff and the Blavet. Lorient completed in this manner would be a model of arrangement, and substantially Lorient will be so completed. At present on the south side of the Blavet the new works have been carried no further than the erection of a line of granite building slips. No new shops have yet been erected, and the old ones remain at the head of the Dockyard, near the ironclad *Surveillante.* The south side of the Blavet is, therefore, only yet in the incipient extension stage; but were an emergency to arise, the entire shipbuilding frontage might immediately be employed. Two years hence, no doubt, the whole of this frontage will be in permanent working order, chiefly, if not exclusively, for iron ships. At present, on the north side of the Blavet there are the barracks on the extreme west, and the sawing and wood-converting sheds on the extreme east. Between, there are several building slips, three large docks some 600 feet in length, the forge, the engineers' and other shops and stores. The sawing and converting sheds, being of recent construction, as well as a fine block of enclosed timber stores, the permanent seat of wood shipbuilding, will be at the upper end of the Dockyard, and therefore the furthest removed from an enemy in case of the passage of the roads being forced. Just now the handling of timber is excessive, the sawing and converting sheds being on the one side of the river and the *Surveillante* and some more wood ships on the other. This, of course, arises from the transition state of the Dockyard, it being necessary to carry on a certain amount of wood shipbuilding even at the disadvantage.

The Stores.

The stores are inconsiderable unless in anchors and old smooth-bore service guns. Of these there is a considerable accumulation, and while the former are undisturbed, the latter are slowly undergoing the rifling process, ordered long ago for a large number of the cast-iron guns in store. Half a dozen men have been told off for sighting after the rifling has been completed. Of masts, spars, cordage, boats, &c. there is a comparatively small stock, while of blacksmith's stock of iron knees, bolts, and other things the supply is large. No intention exists of making any considerable additions to the existing stores, and this circumstance is strongly suggestive of the discrimination of the French in all Dockyard matters. Lorient is a port of construction and a port of war, but less a port of war than of construction; therefore a very moderate stock of war material is required; and as articles entering into the construction of ships are best produced when the dimensions and characters of the ships are first determined, there ought to be no accumulation of construction stores at all. In England, unhappily, there is no discrimination of this kind, and the Dockyards are all as like as peas; there is the same jumble and stuffing of everything, with no consideration whatever whether things are likely to be wanted or not, or whether very moderate quantities would not serve every useful purpose. So a construction port of the first class is practically without stores, and for that reason all that is kept in Lorient would hardly at any time be worth burning by an enemy. It would be a reform of some importance were the Admiralty required to distinguish between construction ports and ports of war, and in all things to adhere to the distinction when once established.

The Shops. Foremost among the Lorient shops is the forge. This, even in its present unimproved state, is one of the best in France. Like all other forges it is an enclosed building, open in the interior throughout, but with double rows of hearths set in clusters, so that on an emergency the men might be set to work as thick as bees. In the chief length of the forge there are perhaps not fewer than 150 hearths, and in the side lengths or wings nearly as many more. This is a stupendous capability for mere ship smith work, but less than will be necessary in the presence of so many contemplated building slips. It will bear repetition, as a point of great importance in Dockyard economy, that smithies supply the mere hand-to-mouth wants of a Dockyard, producing to order and not for contingent or prospective use. They are thus the most formidable part of a Dockyard. The Lorient forge at the time of the writer's visit, in addition to a pretty full complement of workmen, contained quite a number of surly dogs, which were not at all well disposed towards a stranger. The dog-keeping privilege will appear an odd one to English dockyard workmen, but, as will be shown hereafter, it is by no means to be taken as indicative of a higher social status than is accorded in our Dockyards to Englishmen. But at the same time it is due to the Frenchmen to state that a better-looking and more diligent class of workmen is not to be seen anywhere. And when their dinner-hour came, instead of being hustled outside the Dockyard gates, for the benefit of adjacent groggeries, they rested on their anvils, partaking with the dogs of garlic-flavoured sausage, crusts of bread, and diluted wine or water. Good-tempered, honest fellows, may they long enjoy themselves! Adjoining the forge is the engineers' shop, and as a rule where the first is large so also is the second. The engineers' shop in Lorient Dockyard is on a scale of sufficient magnitude, and almost adequately supplied with tools, for all the work incident to all the ships that the Dockyard will ever turn out. Conspicuous among the tools are those of Whitworth and Rigby, and the Havre vertical planing machines. No extension of the engineers' shop is, therefore, in contemplation. Of the minor shops it is scarcely necessary to speak. They are all in perfect harmony with the purpose of the Dockyard, and no disproportionate activity or extension is anywhere to be seen. One feature almost characteristic of Lorient is that locomotive engines of the English agricultural pattern are very much in use. Where anything heavy is to be moved about, spars from the mast-houses, boats from the boat-houses, chains or anchors from the store, an agricultural engine gets steam up and is put in motion. Gangs of loitering workmen are never met with, and the saving from this habitual use of machinery is said to be very great. A few iron boats for harbour work are to be seen about the quays.

The Sawing and Converting Sheds.

The sawing and converting sheds of Lorient are worthy of the first construction port. Nowhere the wide world over is there such an aggregation of suitable machinery. The sheds are conveniently near the water-side, complete convenience demanding a distance not greater than the length of the longest logs that are ever likely to be subjected to the manipulations—yes, manipulations—of the tools. This space is filled throughout with the framework of a line of ponderous travelling cranes, the function of the travelling cranes being to lay hold of and carry the logs towards the machine or machines at which they are to be roughly sawn or nicely shaped. Words cannot convey an adequate conception of the rapidity and completeness of the converting process. This log is fine English oak, and it is intended to use it in the frame of a large frigate. The foreman bethinks himself as the log is approaching him, and he determines its place in the future ship. Whiz upon the saw the log goes, a man guides the see, and in a moment or two a huge piece assumes a shape not at all unlike the letter S. Upon the log the saw is again turned, and the result is a huge piece sawn to an intended angle. Other logs meanwhile are ripped, cross cut, or cut into any shape you choose. At Brest you see the same thing, and at Cherbourg, too, but on a smaller scale. Lorient is the first construction port of France, and the entire woodwork of a first-class frigate—nay, in an emergency, of a line-of-battle ship, may be cut out in a single week by one gang of workmen. Years ago this marvellous machinery was favourably reported on by an Admiralty Commission to the Admiralty, but it has not yet been thought of in our Dockyards. Probably had the machinery been adopted five years ago £1,000,000 or more would have been saved in Dockyard wages, in addition to covering all the outlays that would necessarily have been incurred for the machines.

The Iron Ship Shops.

But let us next cross by pontoon

to the other or south bank of the river Blavet. These smoky-looking shops are for the iron ship work of the Dockyard. A *gendarme* approaches to ascertain that you are really privileged to tread upon so sacred ground. Yes; there is no mistake; and he lifts his cocked hat and walks away. These iron-ship shops at once strike you as the most remarkable feature of the whole Dockyard. They are not entitled to rank higher than similar shops in the building-yard of a second- or third-rate English or Scotch shipbuilder. What is France about? is your first impression. Here are to be seen no great tilt-hammers, no great furnaces for heating armour-plates, no great hot or cold presses for bending armour-plates, no great tools for cutting, planing, or drilling armour-plates. There is nothing of the kind in Lorient Dockyard, and there is nothing of the kind even in contemplation. All that there is is commonplace, and were you to pass judgment in an off-hand manner, you would say inadequate. There, to all appearance, is not the means of pushing forward an ordinary iron merchant ship. But softly; in the construction of the *Couronne* and the *Heroine* ironclads, in the construction of iron batteries, iron transports, and other craft, France proceeds in a different manner from the British Admiralty. The Minister of Marine, instead of entering into competition with the private establishments of France, accepts the services of those establishments in an open and honest manner. Iron ships are to be built at Lorient,—what will you, the private establishments, deliver the material at according to my specifications? Thus the material of the future ship is laid down in the Dockyard just as bricks and mortar are laid down in a field for a mansion, and all that Lorient has to do is to put the mortar and bricks together. So in Lorient Dockyard, for the construction of the most formidable ironclads afloat, tools for drilling, planing, or cutting armour-plates, presses for bending armour-plates, furnaces for heating armour- plates, or tilt-hammers for any purpose are superfluous. A second or third-rate class of tools and conveniences are all that need be cared for.

Difficulties in the way of Establishing such Shops in England.

There are difficulties in the way of establishing such shops in England, and one of the most important would be the getting out the specifications. This is a branch that Admiralty officers have not studied, and therefore one that is not familiar to them. In the leading-strings of prescription and routine they are tied down first to what may be called the general form of ships, in the determination of which there often threatens to be no end of scientific and unscientific rigmarole. At length the general form is a settled thing, sanctioned by the Admiralty, and to be built at all hazards, although the very next day some glaring blunder or other should be discovered. Why this is so is because it is irregular, not usual, without precedent, and the like, for the great Board of Admiralty to be called upon to reconsider anything by their own professional advisers; and on the other hand it would obviously be too much of a joke to expect the professional advisers of the Admiralty to make known their own incompetency to the Admiralty. The general form once adopted is accordingly adhered to, although the country should be saddled with imperfectly teak-backed ships as the *Minotaur*, *Northumberland*, and *Agincourt*. On the general form, contracts are entered into with the private shipbuilders, when ships are built by contract. A ship of a certain length, breadth and depth, with certain other peculiarities, is to be built; and a host of essentials are to be determined as the work proceeds. An analogous case would be that of the giving out of the contract of a house on the general form—length, breadth, and height—leaving windows, chimneys, doors, and other essentials for after consideration. Obviously, such a system, one that does not deal with everything, and not only that, but actually in addition keeps the very classes that it trains hopelessly apart by the most stupid red-tape usages that can possibly be conceived, possesses no individuals competent to frame business-like contracts such as those of the French. When an iron ship is laid down in Lorient Dockyard, the keel, the bow, and stem forgings are received say from Havre, the angle-irons say from Lyons, the plates say from Cruzot, the armour from somewhere else, and the engines say from Ciotat. Each is separately contracted for, and all are made from mouldings sent from the constructor's office. When they arrive at Lorient the parts are put together and the iron ship is launched. No great tools are needed in the Dockyard, the tools of the private contracting firms rendering Dockyard tools unnecessary. This certainly is perfection in contracting; a system that the business men of England would rejoice to see carried out, but one that cannot at the present time be thought of, because Admiralty prescription and routine have prevented the training of a class of professional advisers competent to contract for ships in the manner that ships or anything else ought to be contracted for. England, for a time at least, must occupy the anomalous and discreditable position of wantonly violating one of the best ascertained and most universally acknowledged economic truths; the truth, namely, that private enterprise should not be superfluously interfered with by a

Government. Another difficulty lies in the fact that in the ignorance of the Admiralty as to what is right and wrong in such matters, a large number of costly tools have been introduced into our Dockyards, and further supplies are forthcoming. So we are largely committed to economic wrong-doing,—a circumstance that officials will be always bound to make the most of; but it has rarely been of much avail to plead that, once entered on a wrong course, it is unnecessary to trouble ourselves about a right one. The sophistry is surely too transparent to impose on any man of common sense.

The French Contract System.

But the French not only contract as men of business should contract, they display a liberality which has no parallel in Whitehall. Any Frenchman who can make out a reasonable case, as to financial and other means, stands on the same footing as the oldest and richest in the estimation of the Minister of Marine. He may contract for forgings, plates, boilers, engines, or ships. Favouritism, or 5 per cent. commissions, are unknown, the rule being that the tenders are sent in on one given day and opened on another in the presence of the tenderers or their agents, the lowest tenderer receiving the award. That it is otherwise in Whitehall is well known, and that partiality rules the day is also well known. There is a circle of contractors among whom the good things are pretty evenly divided, outsiders having no chance whatever unless in a season of disappointment and misgiving, as during the Russian war. Curious stories have been told of ineffectual attempts on the part of the unprivileged to propitiate those having the ear of the Admiralty, and it would be interesting some time or other to learn by Parliamentary returns the extent and nature of the concessions which have been made. Very oddly it is said, in defence of the exclusiveness of the Government—to use no harsher term—in all matters of contract, that were they to put themselves in the hands of Jones, Brown, and Robinson, they would fare indifferently, while the truth is, that the present practice is far from satisfactory; and, on the other hand, the French free-trade usage is all that can be wished. There is no Admiralty commodity, not even excepting fuzes, shell, or gunpowder, to which satisfactory tests may not be applied.

The Ships in Construction.

The ships at the present time in construction in Lorient Dockyard are the *Surveillante* ironclad, and some others. The *Surveillante*, a wood ship of the orthodox French pattern, is nearly finished. Fitting with machinery and nearly ready for sea, is the *Heroine*, iron armoured ship, the sister ship of the *Couronne*. Built from the same lines, the *Heroine* and *Couronne* are as like as peas,—short, as usual, with no bulkheads unless in the hold, powerful engines, and small ports. Not far from the *Surveillante*, and on one of the new slips, is an iron corvette, *Blindée*, built and plated in four months from the time of the keel being laid down. Near the corvette is a wood gunboat of light draught of water, the armour of which is to be a belt round the water-line. The armament of the corvette will be one gun, which can be laid for broadside firing from a port on either side forward, or for head firing—for which latter the ship is designed—from an athwart-ship armoured port. This armoured port is in a bulkhead formed of two thicknesses of teak, faced with 4½-inch plates. The gunboat was laid down at the same time as the corvette, and will be finished as soon. Whether those two ships are for the French or the Confederate Navy was, at the time of the writer's visit, doubtful.* More recently it has been said that they are for the latter. For whatever service they are intended they will be found formidable, first by reason of their speed, and second because of their light draught of water. Two wood frigates on which work has been suspended complete the list.

The French System of Designs.

The French system of designs merits passing notice, when speaking of the first construction port. The system is in principle identical with that pursued in giving contracts. No Frenchman with a good design in his head is in the least danger of the fate of most inventors in ship construction matters among ourselves. He will find the means of getting his design considered in a fair and liberal spirit. This is a standing order of the Minister of Marine, an injunction it is indeed alleged of the Emperor. No privileged inventors, theorists, or practical men block the avenues of appreciation and advancement to genius and rising merit. France now and always has and will invite the zealous co-operation of its people in perfecting the engines of destruction. It also has and will continue to honour and reward them. The system is substantially of this kind, so far as the Dockyards are concerned. Attached to each of the Dockyards is a staff of naval constructors, and a pretty numerous staff it is, there being on the average twenty-five constructors to each of the five Dockyards. To these gentlemen the Minister of Marine appeals when he wants anything, and individually the whole number may, submit their views to him. The designs thus received are then handed over to a commission, a commission not constituted to serve Tom, Dick, or Harry, but to maintain the honour and welfare of France. The idea is eminently Napoleonic, and highly creditable to the Emperor. Perceiving the impolicy of confiding the designing of ships to the members of the clique about the Ministry of Marine in Paris, he went the length of giving them no voice whatever in the matter, and placing them on the same footing as the most obscure constructor in the most obscure Dockyard. Our system is well known to be still the one the Emperor got rid of in this democratic manner. At the Admiralty all our ships are designed under the direction of the estimable person who for the time being may happen to be the Controller of the Navy, and who may know nothing whatever of ship designing or ship building. That we should pay the penalty in the possession of indifferent, if not positively bad ships, while France enjoys the benefit of its enlightened liberality, is scarcely to be wondered at.

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* It may seem improbable that ships should be built in a French Dockyard for the Confederates; but, on the other hand, France has knowingly incurred the displeasure or rather, openly defied the Federal Government in the Mexican affair. Had war arisen between the United States and France on that question, the fact of the war being anticipated by the construction of Confederate ships in Lorient Dockyard would probably have been cited as an instance of Imperial forethought. At all events, the writer learned in Lorient itself that those ships were positively intended for the Confederates; indeed, the matter was talked of quite freely.

Defective French Fittings.

Notwithstanding the superiority of the French system of designs in comparison with our own, it is a singular fact that in one respect the French have proceeded on a false principle. They have sought stability and handiness, which, as far as they go, are well enough; but they are not all that must be had. It is in ship-of-war construction, indeed in all ship construction, whether of war or not, of the first importance to keep your ship afloat, under all circumstances, so as to save your ship and crew. France, in losing sight of this broad and obvious view, has committed a serious blunder—very possibly a fatal blunder, were war to arise before the defect is remedied. The ships of France have only to be well riddled by an enemy to sink helplessly, it may be, with every soul on board. All depends on the contingency of invulnerable iron sides, and on the accidental falling in with an enemy less handy, and possessing less stability, whose broadside ports could not be opened. These, manifestly, are unsatisfactory expectations, because circumstances may render them delusive. The 10-inch guns, fired with steel projectiles, will, as experiment proves, sink any ship that swims, unless adequate means have been provided for maintenance afloat after the sea has fairly got inside. In the majority of the French ironclads no attempt whatever has been made to deal with water, and once it gains admission farewell to handiness, stability, and every other thing. That the French have discarded the compartment theory, which can scarcely be said to have ever saved a single ship, is not surprising, because it admits of easy and inexpensive experimental proof, that the ordinary compartments are more likely to be dangerous than useful on most occasions, for a ship with either its bow or stern compartment full would, unless in smooth water, be unmanageable, while one with two forward or two aft compartments full would instantly go down head or stern first. This the French have seen, and, as in the *Invincible*, they prefer a ship without a single bulkhead, without even a division between the engine-room and the stokehole. But if France has mistaken one of the first requisites of a ship-of-war—the keeping afloat under all circumstances, so as to save both ship and crew—we have done the same. We are only about to adopt what is termed the unsinkable mode of shipbuilding. The new ships-of-war building, it is said, are to float as life boats float, although on a different principle, in addition to having armour on their sides. We are not, therefore, in a position to sneer at France. On the contrary, we may well express surprise that, with the knowledge of the means of keeping ships afloat, either when riddled by shot or with their bottoms torn out on rocks, the Admiralty did not long ago set about rendering the fighting portion of the British Navy safe against sinking.

Superior Judgment as to old Wood Ships.

In the use of old wood ships the French display great judgment. Their old wood ships were designed to carry wood planks on their broadsides, and in no case has a point been stretched by requiring them to carry armour. The French ironclads have all been designed to carry armour. Wood ships on the stocks, when the superiority of armour became apparent, either continue on the stocks or have been launched and fitted as wood ships. We have done otherwise in several instances. Influenced by discreditable panic, we laid our hands on ships unfit to carry armour and armoured them. But it will be said the ships answer well—indeed, as well, if not better, than the *Warrior* and some other ships. If such is the case, it furnishes another proof of the deplorable condition of scientific shipbuilding in this country. It is a new proof that ships built for one purpose answer a different one better. The analogous case would be that of a tailor taking your measure for a coat, which coat fitted any other person better than yourself. But it is doubtful whether the truth has ever come out about our ironclads. So many flatterers and apologists abound in Whitehall that truth, as a rule, has little chance. And what—although good time is made in Stokes Bay or on the Maplin Sands at the measured mile,—what is wanted out of an ironclad is the stability and handiness that the French have got, so that manœuvring and firing may be always countedon; for unless an ironclad can fight in rough weather it is really hardly worth the unsinkable Lungley trunkways which would provide against foundering.*

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* The following extracts from Lungley's specification of improvements in the construction of iron ships, &c., A.D. 1860, No. 2,584, will convey a pretty accurate idea of the principle:—

The object of the first part of my invention is to construct iron ships and other vessels in such manner that they shall not be liable to be sunk by any of the casualties which occur to vessels on the open sea, or by striking upon rocks, or by driving upon a lee shore, while at the same time their strength shall be increased, and their accommodation for the stowage and carriage of cargo shall not be interfered with, as it now is where numerous transverse bulkheads are introduced into ships for a like purpose.

The primary feature of this part of my invention consists in dividing the lower part of the ship or vessel into two or more water-tight compartments, and in affording access to these compartments for the introduction of cargo or stores by means of water-tight trunks or passages led up from them to such a height that their upper or open ends shall never in any practicable position of the ship be brought quite down to the level of the water. Compartments thus formed may be used as ordinary cargo spaces, store rooms, chain lockers, or for any other like purposes, and may be ventilated by suitable trunks or tubes, always providing that all trunks or tubes of every kind which enter them shall be made water-tight, and shall rise to the height before mentioned, in order that if by any mischance any compartment should be broken into, and the sea be admitted to it, the water should have no means of escaping therefrom into any other part of the ship.

The next part of my invention comprises several modes of combining the parts of iron ships or the iron parts of ships, so as to increase their strength. In the first place I form a shelf below the iron beams of a ship by rivetting a longitudinal iron of a Z or angular form in section along the under sides of the beams, and a second iron of a somewhat similar form along the ribs or side of the ship, and then rivetting to these irons an inclined longitudinal plate to form the front of the shelf. In order to further increase the strength, I sometimes apply transverse plates to the sides of the beams and to the shelf by means of angle irons, where necessary.

The mode of construction with compartments, as described in the first part of my invention, is particularly applicable to colliers, enabling them to carry water ballast with great convenience and safety. Such compartments may also be used as oil tanks in whale ships, or as fresh-water tanks in any ship, care being taken in these latter cases to keep the oil or the water from coming into contact with the outer skin of the ship by applying false bottoms or sides, or both, to the said compartments.

In the next place, where great strength is required, as in vessels for offensive or defensive purposes in war, where they require to be shot or shell proof, or to resist the shock of running into other vessels, or of breaking booms or harbour barriers, or as n vessels which are required to break or move through ice, or wherever very stout iron and extraordinary fastening are necessary to prevent the different pieces of material of

The Cost of the French Ships.

It was desirable to obtain information on the subject of the cost of the French ironclads, but how was it to be procured? The ships are before you, and if you want to know about guns there they are before you also—the cost of guns being a matter of comparatively little moment; but who is in possession of the figures of the cost of the ships? The writer fortunately procured what must be taken as the facts, although it is impossible, from motives that need not be named, to state the source from which they were derived. The facts are:—*

COST OF THE FRENCH IRONCLADS.

| | | | |
|---|---|---|---|
| *Solferino* ............ | 12,000,000f. | ... | £476,000 |
| *Magenta* ............ | 12,000,000 | ... | 476,000 |
| *Couronne* ......... | 7,000,000 | ... | 277,666 |
| *Normandie* ......... | 7,000,000 | ... | 277,666 |
| *Invincible* ......... | 7,000,000 | ... | 277,666 |
| *Gloire* ............... | 7,000,000 | ... | 277,666 |
| *Provence* ........... | 7,000,000 | ... | 277,666 |
| *Heroine* ............ | 7,000,000 | ... | 277,666 |

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which the structure is composed from being displaced for a considerable distance round the place which may be struck, I propose to build the vessel at and near the part where the strength is necessary, and if necessary the whole of the vessel (even the decks if it should be required to make them shot and shell proof), in the following manner:—I employ two or more thicknesses of plating strengthened by longitudinal and transverse webs and stringer plates, secured to and at the joints of the thickest plating of the shell or skin of the ship, which is made as thick as is necessary to resist the blow which it is designed to receive. This part of the invention is illustrated in figure 14, which is a transverse section of a ship constructed as just described. The centre parts (*a*) of these plates are worked, forged, or rolled of greater thickness than the edges (*b*), in such manner as to make the centre part of the plate able to resist a blow equally with the parts near the edges; or they are made of a parallel thickness as some are shown at (*c*) in the section, when economy in weight is not required. The edges of these thick plates are usually formed on the inside with flanges, webs, or angle pieces in such a way as to fit against the longitudinal and transverse webs or stringer plates, and receive the fastenings. But in some cases I fit and secure angle irons to them near the edges for such purpose. Both of these plans are illustrated in figure 14.

* M. Dupuy de Lome the other day in the *Corps Législatif* gave a different version of the cost of the French iron-clads. I can do no more than place his statement and mine side by side, repeating that the source of my information is official also, and as much entitled to the credence of the public. He says:—

The *Magenta* and *Solferino* cost from five millions to five and a half each. The *Couronne* cost more, because it was all iron, and in France building in iron is more expensive than building in wood. There is, therefore, a considerable reduction to be

The uniformity is striking; and it is a fact that although the *Solferino* was built at Lorient and the *Magenta* at Brest, they both cost the same; and it is a fact that although the *Couronne* and the *Heroine* were built at Lorient of iron, and the *Normandie*, *Invincible*, *Gloire*, and *Provence* at other Dockyards, of wood, they each cost the same. The fact is, the price was predetermined by elaborate specification; specification of a kind that the whole collective wisdom of our own Admiralty could not produce, so infinitely behind the French are they in such a matter. To be sure the Minister of Marine has, in a certain sense, one advantage over the Admiralty, inasmuch as he has the power of paying as he likes for certain work, indeed for any work,* so that

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made in the expenses which have been criticised, and I believe myself able to affirm that with the remaining 120 millions we shall nearly realise the programme of 1857. I will add that foreign frigates have cost more than our own; the English frigate *Warrior*, for example, cost nine millions. Again, it has been objected that our ships are smaller than those of other countries. That is true; and I think it an advantage, as it combines greater rapidity of movement with equal resisting power. Then we are told that our frigates are not entirely covered with armour. This is a mistake: all our frigates are iron-clad, both fore and aft. It is also said that our frigates are bad sailers, and roll terribly. But the despatches of Admiral Pénaud report that they behaved admirably, especially one night in the Channel, when the waves rose nine yards high. They might even sustain a comparison in point of rolling with the *Napoléon* or with the *Tourville*, both of which were considered exceptional in that particular. The iron-clad ships *Magenta* and *Solferino* rolled, in fact, rather less than the *Tourville;* the frigates rather more, but not extravagantly. The hon. commissioner went on to say that he did not understand the criticisms on the composition of the Council of Works. That Council was composed, for the most part, of naval officers, and it was the majority of naval officers in council that decided all questions. On the subject of the artillery of the marine, he (the speaker) would not hesitate to affirm that France was more advanced than her neighbours in that department. But guns, said M. Dupuy, in conclusion, capable of piercing iron plates have not yet been invented. If invented, I am bold enough to say it will be by France, nor have I any doubt but that ironclad vessels will have to be modified according to the advancement of science.

* The Minister of Marine has the power of withdrawing shipwrights and others from the private establishments, legally paying them at the rate of three francs a day (2s. 6d.), although at the time they may have been earning five, six, or seven francs (4s. 2d., 5s., or 5s. 10d.). He has the power of arbitrarily fixing the wages of Dockyard labour, and by that means can predetermine the cost of anything, or enforce uniformity of cost in all the Dockyards. When French workmen combine it is, of course, at the peril of Cayenne, with a lease of life the average duration of which is six months from the date of landing.

when he orders an ironclad or a fleet of ironclads at a price, they are of course produced, and not a murmur is ever heard. But, practically, the Admiralty exercise the same power, although they do so in an irregular and bungling manner. They have, for instance, men on the establishment serving the periods that will entitle them to superannuation, and it is well known that some of the old fellows are sadly kicked about, and occasionally in the end not fairly treated. Why not give them instead what they earn, in a scheme of prices, for ships on the French plan, and keep faith with them, or get rid of them under a businesslike scheme of compensation? The matter is worthy of consideration. Nor less so is the fact that in France iron-clad ships are built for a predetermined sum, while in this country there is neither uniformity of price in the Dockyards nor in the private shipyards, no two ships of any class costing alike. It has been said that the *Couronne* has been a more costly ship than any of the others owing to the peculiarity of the construction already noticed, but such is not the case. The iron frame and skin of the ship were necessarily a lesser charge than the same parts of a wood ship. Whether the shipwrights of the *Couronne* and the *Heroine* were "screwed" by the Minister to obtain uniformity, will perhaps be never known.

## CHAPTER V.

## ROCHEFORT.

A Natural Dockyard.* Like Lorient and Brest, Rochefort is a natural Dockyard, and it ranks fifth both as a construction port and port of war. Its natural capabilities are very great, quite equal to those of Lorient, and no doubt in a time of war it would immediately be raised to an equality with Lorient for construction if not for war. Entering the Basque Roads from the Bay of Biscay, between Ile de Ré and Ile de Oléron, we are in the embouchure of the Charante. Here great fleets have assembled, and would no doubt again assemble. Here Lord Cochrane executed one of his dashing projects, defying the batteries of the time and destroying ships of war. Here the first Napoleon surrendered to Captain Maitland of the old *Bellerophon.* It looks a great place, and is a great place, but in comparison with the roads of the other Dockyards it is weak, so much so as practically to be in a state of nature. The Basque Roads are the last to receive the attention of the authorities. Batteries on the islands and on the mainland are as they were years ago.

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* Deptford and Woolwich are the offset to Rochefort. The first it is proposed to dispense with, but not the second. Woolwich is an astonishing place, the original in a certain sense of that equally astonishing place at Kensington. Why Kensington has, however, received so much abuse, and Woolwich so very little, is not easily explained. Perhaps the explanation is to be found in the fact that the public visit Kensington and are excluded from Woolwich. It is a pity that Kensington was not the prohibited place and Woolwich the open one, because great as has been the expenditure and waste at Kensington, they bear no comparison with the expenditure and waste at Woolwich. It is to be hoped that the day is not distant when the abuses of Woolwich will be probed to the bottom and exposed. With the view of directing attention to the subject, let us give prominence to two or three things: and first to the position of Colonel Boxer of the Royal Laboratory, and of Mr. Anderson of the gun factory. Colonel Boxer, during what may be called the Armstrong and Whitworth gun controversy, has been called on by the War-office to provide fusees and fill shell for the Whitworth guns. This Colonel Boxer has done and is doing to the best of his ability. Now why should Colonel Boxer be called on to do those things for Mr. Whitworth, or rather, for the Manchester Ordnance Company? Once admit the principle of taking an inventor by the hand in such a manner, and it is impossible to say where the Government should stop. Nor let it for a moment be supposed that all Colonel Boxer's discoveries and inventions in ammunition for the Whitworth guns are exclusively for the public benefit. They may or may not turn out to be for the public benefit, but they most assuredly are for the benefit of the Manchester Ordnance Company. That company enjoy the advantage of the unlimited expenditure of the public money by Colonel Boxer in their regular trade as makers and sellers of guns and ammunition to America, Brazil, Denmark, &c. What Colonel Boxer discovers, the Manchester Ordnance Company are believed to apply in their regular business. Then, again, Mr. Whitworth has experienced difficulty in making guns of large calibres, and the Woolwich gun factory has been more or less at his disposal; perfecting for him that which he could not himself

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accomplish. Why again should this be so? If such a course is taken with the Manchester Ordnance Company's guns, then the Government may be fairly called upon to complete or to attempt to carry out any good thing that appears to come in their way. The principle is vicious and indefensible. The costly aid rendered to the Manchester Ordnance Company is equivalent to a money grant or bounty; and these are not the days of bounties. But even granting that it were quite right to do all that has been done in behalf of the Manchester Ordnance Company, it is a monstrous abuse that Woolwich should not tell us what it is doing in behalf of the Manchester Ordnance Company, what it is expending annually, and what it has spent altogether in behalf of that association of private individuals. Then Woolwich embarks at pleasure in the wildest enterprises. Going back to the time of the Russian war, Woolwich committed an act of folly that would have justified the withholding of another vote by Parliament. Woolwich began to make cast-iron cannon in competition with the Lowmoor Iron Works, but failed in turning out a single gun, so it is said, notwithstanding incredible outlays and waste. Over the expenditure of Woolwich there is practically no control, the irresponsible heads of departments doing what they like and as they like. The dock and slip accommodation at Deptford and Woolwich is as follows:—

| | Length at top of dock. | | Width of entrance. | | |
|---|---|---|---|---|---|
| | ft. | in. | ft. | in. | |
| No. 1 Dock ............ | 265 | 0 | 65 | 0 | |
| „ 2 „ ............ | 272 | 0 | 65 | 0 | Being made 10 ft. longer on the blocks, and 74 at the top. |
| „ 3 „ ............ | 290 | 8 | 80 | 0 | |
| Outer dock, Deptford... | 196 | 0 | 54 | 0 | |
| Inner dock, Deptford... | 190 | 4½ | 46 | 10 | |

Number of building slips—1 of 1st class; 7 of 2nd class; and 4 of 3rd class.

No new bastions, no new works of any kind are visible, while the guns in the embrasures and *en barbette* are all of the bygone smooth-bore pattern. Ask why this is so, and you can at once divine the reason. Delay was possible at Rochefort, and is still possible; therefore the public service is not at the moment burdened with expenditure which may as well be postponed. On the Bay of Biscay the works at Brest and Lorient are alone pressing, and until those works are completed Rochefort must wait. Passing from the roads to the river which forms the harbour, you are reminded of the Blavet on which Lorient stands. The Charante is another Blavet, another river Thames, such as that is at Greenwich during low water. On both si desthe Charante admits of the same works as are in contemplation and the same extensions as are in progress at Lorient. There may be one or more miles of building slips, and as many basins commanded by forts as are thought necessary. When the turn of Rochefort comes for reconstruction, and the Dockyard is finished on the Lorient model, France will be in possession of the two best construction ports in Europe. Between the two construction ports a most formidable fleet, indeed the most formidable that ever put to sea, might be produced annually either from rough logs of timber or from angle and plate iron received from the Lyons and Belgian foundries.

The Sea Approaches. Although the works covering the sea approaches of Rochefort Dockyard are in a state of dilapidation, it would be rash to infer either that France is careless or that in case of war the Dockyard would be defenceless. France is careless of nothing, and certainly not of anything that appertains to its honour. In addition to the financial reasons which have operated in

Paris, and spread the reconstruction of the French Dockyards over a comparatively long period, and in addition to the consideration that in a strategic sense the changes at Brest and Lorient should take precedence of those at Rochefort, it is to be remembered that France entertains anything having reference to Rochefort with extreme reluctance. It is a place of painful, because humiliating, recollections, and even the bare mention of the name is avoided as much as possible. There what may be called the grief of France is buried; and in such matters it is much the same with a nation as with an individual—painful things are banished from our thoughts. But Rochefort has a warm and enduring hold on Frenchmen. Let the disinclination to think of it be only overcome, and the occasion arise when it must be attended to, and it is probable that affection would not rest short of making Rochefort a second Toulon. In Rochefort one still hears of Waterloo. In Rochefort *perfide* Albion remains unforgiven. In Rochefort the hope survives that the day of retribution is approaching. Were Rochefort to have its will, the French fleet would receive its sailing orders for the Thames, and the humiliation of France in 1815 find atonement in the humiliation of England in 1864. And all along the shore of the Bay of Biscay there is much the same feeling. Consuls in daily intercourse with all classes of Frenchmen have long been aware of it, have long lamented it, and no doubt have repeatedly represented it to their Government. Englishmen, also, serving with the French, have had abundant proof of the existence of the undercurrent of a hatred that is inextinguishable. It is well to mention this, because it is the truth, and the truth in such a matter should be told. So, therefore, it must not be inferred that in case of war Rochefort would be defenceless. Exactly the contrary would be the case. When an army establishes itself in an enemy's country, a few hours suffice for the throwing up of field works which practically are impregnable. A few days certainly would suffice for a willing population to restore dilapidations and replace the smooth-bore cannon in the casemates by rifled weapons from the arsenal. Rochefort is a place that may be expected to hold out against England to the last extremity.

The Land Approaches. The land approaches of Rochefort Dockyard are difficult, but neither by reason of fortifications nor hills; it is owing to the swampy and broken nature of the country. Everywhere there are great ditches, more or less full of water, crossing one another in all directions. Those ditches are supposed to drain the town and district, but the manner in which they do so, in the sense in which Englishmen speak of drainage, is not at all obvious. What they appear to do is to withdraw the surface water to some extent and collect it in the ditches, out of which it finds its way slowly by evaporation. With the contrivance, however, the Rochefort and country people are highly pleased, and it is their impression that there is nothing more required of them in a sanitary point of view; the Rochefort of the time being, it is true, incomparably more healthy than the Rochefort of former years. Of course, over the Rochefort ditches an invading army would soon find its way; but whence, it may well be asked, will the army come? To wrest Rochefort from the French would be to gain a victory which in the nature of things would be extremely barren, because the conquest would have to be abandoned before peace were again restored.

Rochefort, like Lorient, is in communication with all the railways, and, therefore, in peace or war may command whatever coal or iron it requires.

The Harbour. Rochefort harbour, like Lorient harbour, is of great length, and admits of being made as long as may be wished. Dredgers, too, may deepen it and excavators widen it until the requirements of any period are amply satisfied. At present it is undredged, unwidened, and filthy. Ships enter it and anchor, or are moored in mid-stream, where they are not always easy of approach. Some quays and wood piers, to be sure, exist in some parts, but they are neither good enough nor adequate enough to redeem the whole from censure. It is a harbour of the period when the best part, or the most used part, of our own Portsmouth was the open roadstead of Spithead. Everything practically is as it was fifty years ago. Still it is very useful. There ships of all classes are collected, especially transports, as at a central station equidistant from Cherbourg on the Channel and Toulon on the Mediterranean. There the shops are busy with repairs, and the shipwrights on board ship are actively bringing forward all backward ones to the second or first class, in which classes they may either remain ready in the Roads or be sent to the other Dockyards. Thus the harbour of Rochefort does good service. It is one of the great repairing places of the French Navy, one of the great reserve stations from which a number of the ships forming any great expedition would assuredly proceed.

The Town. The town, like all the other Dockyard towns, whether French or English, is not of much account. The centre of the famous brandy district naturally suggests a clean and wholesome place, but sanitary enlightenment has not yet penetrated to the Charante. Were brandy-drinkers to see where their beverage comes from,—the dingy, weather-beaten houses, the ill-paved and ill-cleansed streets, the humid atmosphere, the low-lying, swampy country, and, above all, the untidy, squalid population, there is some reason to believe that they would take to drinking something else. In the town of Rochefort there is nothing notable, unless that the lower classes have perhaps suffered more than the population of other Dockyard towns from the constant and demoralising presence of a garrison. The innkeepers, probably from the same cause, are unscrupulous enough to practise extortion on all visitors, whether Frenchmen or foreigners.

Access to the Dockyard.

The writer found his way to the Prefecture of the Marine at an early hour, and interrupted the gardener on the plot of ground round which the First Napoleon sauntered, making up his mind as to the course to be pursued, on the eventful morning that he took leave of France for ever. Well may the associations of the spot stir the souls of Frenchmen. It has an air of contraction and plainness not at all in keeping with the man. It is a London garden behind St. Michael's-alley; with this difference, that in lieu of lofty business buildings, there are the low-roofed, miserable Prefecture on the one side, and the equally low-roofed and more miserable offices on the other. Passing the night in such a place in the course of a campaign would have been well enough, but after Waterloo, being there must have impressed the mind painfully. The gardener was a meek man, and, answering a few questions, pursued his calling. The officials at the Prefecture are not early risers, and it would be necessary to call again. Calling again some hours afterwards the authority to visit the Dockyard was ready waiting, and under the new but not by any means displeasing condition that the writer, if he desired might proceed alone. Never had courtesy been carried further to an Englishman in Rochefort. Unaccompanied by commissioned officer, *gendarme*, or sailor, the privilege was granted to go about at pleasure. Private doors might be opened, stores and shops entered, ships boarded, and guns inspected, without formality, under the authority of a slip of paper carried in the hand. At all the other Dockyards the privilege to visit was quite as great, there being no restriction of any kind, the mere will of the writer determining the movements of the guides; but be it said of Rochefort that however keenly it may feel the indignity of France having suffered at the hands of England half a century since, there are manifested towards Englishmen a respect and confidence not to be found elsewhere.

The General Plan of the Dockyard.

The general plan of Rochefort Dockyard is the same as that of Lorient, only Lorient is more extensive and embraces works on both sides of the Blavet. The whole of the Rochefort establishment is on the town side of the river, and there is this peculiarity in the arrangement, that whereas in the modern French Dockyards all combustibles are removed as much as posssible beyond the risk of bombardment by an enemy, in Rochefort the incombustibles may be said to occupy the place of safety. Than this circumstance nothing could better show the difference between an old and a modern Dockyard. Now-a-days everything, at least in France, is arranged in a well-considered manner, but formerly there was no rule, and convenience or caprice were the sole regulators. In Rochefort it was felt to be convenient to have the great storehouses as near the Basque Roads as possible, so that ships of war might be provided for without delay, and accordingly the storehouses formed, and still form, the outer extremity of the Dockyard. Hereafter, when the Dockyard undergoes reconstruction, either the storehouses will be rebuilt elsewhere, or the harbour receive a sufficient extension towards the Basque Roads, covered by suitable works to prevent an enemy's shell setting fire to the storehouses. Strange to state, although Rochefort is the only French Dockyard that remains on the old-fashioned plan, all our English Dockyards are still unmodernised. A fleet occupying Spithead would burn Portsmouth Dockyard, a fleet passing Gravesend would burn Woolwich, a fleet occupying the Medway would burn Chatham Dockyard, and a fleet occupying the Hamoaze would burn Devonport Dockyard, because all the combustibles would be within range. The combustibles are stored where convenience indicated, no one ever dreaming of such a thing as burning. Change in England would of course be a serious matter, but certainly much less serious than destruction. Nothing less will suffice but abandonment, or a general reconstruction such as that which Brest is just now undergoing. The storehouses to be safe must be transferred to the rear so as if possible to be out of range, and the front occupied with those accumulations which are incombustible.

The Stores.

Surveying the Rochefort storehouses conveys to one an entirely new impression. They are seedy in appearance, closed and deserted. Sometime or other the order had gone forth that the work of accumulation should cease, that the keys should be turned permanently and hung in the anteroom of the Prefecture, and that the *gendarmes* and others should be relieved from further attendance on them. So it is possible to carry Dockyard accumulation to a stopping point. Stock may be taken, and a close guess hazarded of all possible wants in all possible emergencies, and that point worked up to, it is superfluous to proceed further. That is the impression the Rochefort storehouses forcibly convey. Nor is a guess of this kind the difficult and serious matter those unacquainted with such things are likely to suppose. The points are few in number, and what is scarcely less important, there is not one of them that reasonably or practically may be deemed uncertain. Let us name them. The greatest enemy that France can ever have on the ocean is England; what then is the utmost defensive quota in ships and material that will be required of Rochefort? Again: it is possible that a great action will be fought off the coast, or in the Basque Roads, what in that case would be the utmost of the requisitions on the store department of Rochefort? Beyond those two things there is nothing to be thought of, and the fact that the great storehouses of Rochefort Dockyard are locked, justifies the conclusion that France has gauged the extent of both. The compilation of Bradshaw's time-tables, the providing satisfactorily for a Brighton field-day with the Volunteers, or the developing of Mr. Gladstone's Life Assurance or Post-office Savings'-bank scheme, is much more arduous. Any commonplace London merchant might be safely trusted with the computation of the necessary supplies either for the French or for her Majesty's Dockyards, but so much mystery and fuss are made about the Dockyards of this country that business men are not soon likely to have an opportunity of showing what they might do. Were

France afflicted with a Board of Admiralty, it would no doubt fare as badly.

The Shops.

The Rochefort shops, with the single exception of the wood sawing and converting sheds, are quite up to, if not actually in excess of, the Lorient mark. There is a fine forge with small Glasgow hammers, and an engineers' shop quite equal to the overhaul or fitting of the engines of a fleet. Of late no extensions of either shop or forge have taken place, and it is questionable if any would be necessary even were the Dockyard to be remodelled. Judiciously employed clusters of blacksmiths' hearths in rows, within successive buildings, until in the aggregate the number exceeds two hundred, represent, on an emergency, a capability the value of which could not well be measured; and judiciously employed long benches and great centre spaces filled with mechanics' tools would render a corresponding service. When the present forge and engineers' shop were erected and supplied with tools, the presumption was that they would be equal to the wants of any number of ships that ever visited or sought refuge in the roads, be their condition what it may. Nothing that has since happened disturbs the calculation. To be sure, the repair of indented armour-plates is an innovation, but it is one against which France leaves the private workshops to provide. No mills or hammers are erecting in the Dockyards under which indented or fractured armour may be put to rights, and the intention is that, when stripping must take place, the old plates must give place to new; the old plates going where the new ones come from. The soundness of this determination few Englishmen will dispute. The other shops of the Dockyard are relatively on a smaller scale. Indeed, they are exactly as they were before the forge and engineers' shop were introduced. The enlargement of those is therefore probable, although it may appear, on consideration, that, with the facilities now enjoyed by railways and the telegraph, the excess of one Dockyard will in an emergency become available in another. This at least is the impression in Rochefort, and a most reasonable one it is. For let it always be remembered that why so many shops were erected in the French and our own Dockyards, is explained by the fact that those Dockyards were established on outlying parts of coast which were not within convenient reach. Now the passenger from Paris in the morning may dine in Rochefort, Lorient, Brest, or Cherbourg; and the morning passenger from London may luncheon in Chatham or Portsmouth, or dine in Plymouth. That this facility of communication should now count for something in the reconstruction of a Dockyard is what may reasonably be believed.

The Basins, Docks, and Slips.

Rochefort has no basins, but it has three excellent docks, and as many as seventeen building slips. The dimensions of the largest dock are, length, 450 feet; breadth, 60 feet. Of the next largest, length, 360 feet; breadth, 80 feet. Of the smallest, length, 210 feet; breadth, 55 feet. The building slips are in a condition that might without injustice be called disgraceful. On some no ship has been built for years, and the blocks lying undisturbed, exposed to rain and sunshine, are in various stages of decay, and unsightly. Others are remarkable for the neglected state of the masonry, which is fast crumbling to pieces. Even in those cases where ships are on the slips, the condition is not to boast of. Why this should be the case while the docks are all that could be wished has its explanation in the fact that, as already stated, the repair of ships is actively carried on at Rochefort, and those ships invariably occupy the docks for longer or shorter periods.

Ships in Construction. The only important ship in course of construction just now is the *Guyenne*, an ironclad of the *Gloire* class. Several wood ships are also on the slips, but work is not proceeding on them, for the same reason that there is a suspension in the other Dockyards. After the suspension of the wood work it was of course desirable to keep the Rochefort Dockyard hands in full employment, and with that object the *Guyenne* was ordered. Still, although there is a cessation in the building of ironclad frigates, a smaller class of iron ships is in hand, and, as will be shown hereafter, the construction of ironclad batteries is being pushed forward with great vigour. The cessation of ironclad frigates may therefore imply no more than that there is enough of them afloat, and in the Dockyards, until at least the number of small iron ships and batteries has been increased. Among the ships in port are the iron battery *Saigon*—a battery that Frenchmen say will either keep a roadstead against any ship that swims or act wherever its services may be required.

The Defence of Roadsteads. The defence of roadsteads suggested by the Saigon is one of considerable interest and importance. On this side of the Channel there is no well established opinion on the subject, while in France there is. The French regard their roadsteads as practically undefended, no matter what number of guns may cover them, until floating batteries have been provided to block the Channel. This is their opinion and rule. On the contingency of the presence of a fleet or squadron at the time of attack they do not count. The fleet or squadron they say are likely to be elsewhere just at the time their services would be wanted, and for that reason they prefer being independent of what they call extraneous aid. If a fleet or squadron happen to be present at the moment of attack, then the enemy will receive all the warmer a reception, but if absent the honour of France will not be endangered. It is impossible to be unconvinced by such reasoning, and it is strange that the Defence Commissioners and others never thought of laying down the same absolute rule in this country. All the length that we have ever got on this side of the Channel is that floating batteries are a good thing, and may be employed with great advantage. Vague notions of what the fleet would do, or the chapter of accidents would bring about, have in point of fact shelved the subject; and while the French roadsteads are all on the point of being defended by floating batteries, ours are to continue open.

The French Batteries.

The French floating roadstead batteries are of various models and power, but as regards draft of water and strength they are much alike. The latest are fitting with double screws, and, as will be seen hereafter, are the most solid iron structures that have yet been built. The earlier, or those of the Russian war period, are the same as those of our own constructed at the same time. From the double screw many French officers anticipate the best results, but an influential minority have as little faith in the principle as many naval officers and scientific men among ourselves. They dislike it, and why they do so does not appear, or, in other words, does not follow from what they say. Perhaps it is a prejudice that time will overcome, especially for harbour work, in which any supposed danger incident to sea service would not occur. That one and all of the double screw and other batteries will, if well fought, prove hard customers anywhere, is not for a moment to be doubted. French officers rightly count their batteries with their effective ironclads, because for particular service they would be just as useful as any other. Operating against ourselves, for example, good weather would be chosen for the Channel voyage, and then in smooth water their broadsides might be opened. During the Russian war some of the clumsy batteries of the time were safely navigated to the Baltic and the Black Sea and back again.

Harbours Requisite in a Good System of Defence.

But harbour defence implies harbours to be defended, and if it is chargeable against us that we have not formed an opinion on the subject of batteries, we are equally to blame in the matter of harbours. A few years ago, when men's minds were familiar with peace, and peace platitudes were on the lips of all, a commission issued to take evidence as to refuge harbours, but practically nothing has come of the report. All that has been done is that those desiring harbours, or improved harbours, will be assisted by loans for that purpose. Under such conditions the country may or may not possess the right sort of harbours in a century; and in the course of that time many thousands of lives will have been sacrificed, and almost sufficient property destroyed to construct all the harbours necessary a dozen times. But without harbours on every coast of the United Kingdom, not excepting Ireland, into which single ships-of-war if not squadrons could find their way in a time of pressure and difficulty for overhaul and repair, it is impossible to conjecture what shall be done, or rather what shall become of us. Ships disabled in the North Sea should find all they wanted on the Scotch coast somewhere between the Dee and Tay; ships disabled on the Dutch coast should find all they wanted on the Norfolk and Suffolk coast; and ships disabled in the North Atlantic should have no more to do than make for the nearest land. But as matters stand, ships disabled in the North Atlantic, on the Dutch coast, or in the North Sea must make the best of their way to Chatham, Portsmouth, or Plymouth, no matter what time may be consumed or what the exigencies of the time may be. There are neither harbours nor docks where they are most likely to be wanted, and the consequences may be disastrous in the extreme. In France it is otherwise. On no French coast would a squadron, or even a fleet, be at any loss: Havre, on the Channel, St. Nazaire, Nantes, and Bordeaux in the east, and Marseilles in the south. At each of those places the public money has been spent not grudgingly, but willingly; the initiative being with the Minister of Marine, not with the municipalities, or the shipowners. French commercial harbours are thought of in relation to defence, and whatever is required is granted; English commercial harbours, on the contrary, are not so thought of or favoured, because we have no competent responsible official to devote attention to them. Mr. Milner Gibson, instead of the Duke of Somerset, disposes of our harbour questions; and the President of the Board of Trade, as a man of business, is in duty bound to take a view so narrow and prosaic that harbour extension and improvement, so far as Government assistance goes, is at a perfect standstill.

Convict Labour available for Construction.

For the construction of harbours the convict labour of the country, of which there is an abundant stock, is available. At present, whether the convicts work or not, they are lodged, fed, and clothed, and employed on harbours there would be no additional expenditure for those things. Beyond the tools of labour and the material for labour, there would be no expenditure; and inquiry will convince any one that the expenditure for material and tools is very small, the material being cheap and the tools rough and strong. Still it will be said that convict labour is always and has always been unproductive, but that is a mistake. The truth is that it often is, and always may be, as productive as any labour. On St. Mary's Island, Chatham, most efficient convict labour will be found, and side by side with it there will be also found the causes that ever render it tedious or unsatisfactory. Those causes are the absurd regulations under which the labour is carried on, and the equally absurd restrictions imposed on the convicts and those who approach them. But for those restrictions the convicts would accomplish all that human nature can accomplish. Tobacco or snuff must not be given or received by convicts. To withhold these are considered serious punishments. They may be so to snuffers and smokers not inured to the privation, but they are no punishment to others. Sir Joshua Jebb, however, thought otherwise, and there are many of his way of thinking still surviving. So to prevent snuff and tobacco getting into the hands of convicts it will be found on inquiry that the efficiency of convict labour is often compromised. Then the reformation of convicts is a great point, and to that labour, and in fact everything, is as a rule subordinated. The convicts pray at a certain hour in the morning, and again at a certain hour at night, and of course it would never do to pray with dirty hands or faces. So before evening prayer work ceases for the day, no matter although the spring-tide answers for the foundations of the works on St. Mary's Island. After prayers it is seemly to retire, and the convicts do retire. Then some of the convicts' time should be passed in school as well as in chapel, and each day has its school hour, or each week its school day, equally for old and young, the learned and illiterate. Thus really good working plans are impossible. But there are also sanitary precautions. To preserve the health of convicts they must not leave the prison when it rains, and if the forenoon has been spent in prison, what is the use of turning out in the afternoon? Thus convict labour is mismanaged; but that is no reason why it should continue so. It is a reason rather that change should be thought of. Among those in charge of our working convicts it will be found that a very strong opinion is entertained of the availability of their labour. This the writer discovered when he visited the Chatham and Portsmouth prisons last year. Some of the officers had long thought of constant harbour work for all convicts and of moveable iron prisons, so as to admit of moving from place to place. With such prisons, material, tools, and common sense regulations, they would engage to construct as many harbours as were wished. And that they could do so is not to be doubted for a single moment, the work on St. Mary's Island, Chatham, being the proof. Why the French have ceased, or have nearly ceased, to employ convict labour in their Dockyards will be noticed elsewhere.

## CHAPTER VI.

## TOULON.

A Natural Dockyard.* Toulon is a natural Dockyard, and its rank is that of the fourth port of construction and third port of war. The principle of this classification here invites attention, because Toulon in reality is as great a port of war as Cherbourg, and as great a con-

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[*] Plymouth, Devonport, Keyham, and Sheerness are a good English offset to Toulon. Sheerness is a mere fitting Dockyard; the others are building, repairing, and fitting Dockyards. There is a good practical joke of long standing in Devonport Dockyard. When one of the Georges died a great monument was erected to him, from the top of which a fine view of Mount Edgecumbe and the Hamoaze is obtained. Against this monument there is a tombstone bearing an inscription to a favourite dog. Perhaps the dockyard official, whose dog died and was buried there, was not aware that he was paying a left-handed compliment to the Crown. The dock and slip accommodation is as follows:—

PLYMOUTH, DEVONPORT, AND KEYHAM.

| NAME OR NUMBER OF DOCK. | Length at top of dock. | | Width of entrance. | | Remarks, &c. |
|---|---|---|---|---|---|
| | ft. | in. | ft. | in. | |
| Devonport. | | | | | |
| No. 1, Basin dock | 299 | 0 | 65 | 0 | Two old docks being altered into one. New one (constructing). |
| " 2, " 3, | 437 | 0 | 73 | 0 | |
| " 4, | 241 | 2 | 56 | 2 | |
| " 5, | 275 | 10 | 64 | 0 | |
| Keyham. | | | | | |
| No. 1, South dock | 356 | 6 | 80 | 0 | |
| " 2, Middle dock | 308 | 0 | 80 | 0 | |
| " 3, Graving dock | 307 | 0 | 80 | 0 | Being altered and made 136 ft. 6 in. longer on keel-blocks, and 109 ft. at tops. |

Number of building slips—1 of 1st class; 2 of 2nd class; and 3 of 3rd class.

struction port as ever Lorient is likely in the course of things to be. How, then, is Toulon rated so very low? Obviously the capabilities of the Dockyards do not determine their standing at the Ministry of Marine. What, then, determines their standing? The answer is the somewhat unpleasant one that the Dockyards are rated in conformity with their availability for attack or defence against this country. Cherbourg is the first port of war because it is nearest England. Brest is the second port of war because it, next to Cherbourg, is nearest England. Lorient is the third port of war because it, next to Brest, is nearest England. Why Rochefort does not follow is because of its neglected state. The present condition of Lorient and Brest has been described already, and although both are in the throes of reconstruction they take precedence before ready and most formidable Toulon. If it is said that the classification of the construction ports does not bear this interpretation, the answer is that the principle is not so much a matter of proof as one of fact. The principle of the classification in both cases is availability for attack or defence against this country. How stands the case of the construction

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SHEERNESS.

| Name or Number of Dock. | Length in blocks at bottom of dock. | Length at top of dock. | Width of entrance. | Depth of water on sill at O. W. H. Spring Tides. | Depth of water at O. H. M. Neap Tides. |
|---|---|---|---|---|---|
| | ft. in. | ft. in. | ft. in. | ft. in. | ft. in. |
| No. 1, Dock............... | 241 0 | 253 4 | 57 7 | 25 2 | 20 8 |
| „ 2, „ .............. | 225 7 | 251 10 | 57 8 | 25 2 | 20 8 |
| „ 3, „ .............. | 241 0 | 253 4 | 63 5 | 25 2 | 20 8 |
| „ 4, „ .............. | 180 7 | 203 10 | 50 3 | 19 10 | 15 4 |
| „ 5, „ .............. | 154 4 | 196 1 | 58 7 | 14 8 | 10 2 |

Number of building slips—1 of 2nd class.

ports? Cherbourg is fourth, Brest second, and Lorient first. Why is this? Obviously the first port of war should not be the first construction port, because French fleets will there assemble in so great force as very likely to provoke attack, and in an attack a great construction Dockyard, notwithstanding all the precautions that may be taken, will be in danger of getting burned. That Brest should be the second port of construction as well as the second port of war ought, from what has been said before, to be plain enough. The construction department of Brest Dockyard scarcely admits of being burned, so secure is it. That Lorient should be the first port of construction while only the third port of war should also stand in need of no explanation. The Lorient construction department is superlatively secure, both by reason of its position and by reason of Lorient standing between Brest and Rochefort; an attack on Lorient leading inevitably to the instant concentration of the Brest and Rochefort reserves on the attacking force. Thus the objection is met both by contradiction and formal proof. Yes, the classification of the French

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LIST OF NUMBER OF FLOATING BASINS IN H.M. ROYAL DOCKYARDS.

| NAME OF DOCKYARD. | No. of basins. | Water area of basins. | | |
|---|---|---|---|---|
| | | A. | R. | P. |
| Deptford | 1 | 1 | 1 | 8 |
| Woolwich | Outer Basin | 3 | 0 | 33 |
| " | Inner Basin | 2 | 2 | 16 |
| Chatham | Nil. | | — | |
| Sheerness | Great Basin | 3 | 2 | 5 |
| " | Small Basin | 1 | 0 | 23 |
| " | Boat Basin | 1 | 1 | 7 |
| Portsmouth | South Basin | 2 | 1 | 30 |
| " | Steam Basin | 7 | 0 | 0 |
| Devonport | 1 | 1 | 2 | 6 |
| Keyham | South Basin | 7 | 0 | 32 |
| " | North Basin | 5 | 0 | 0 |
| Pembroke | Nil. | | — | |

Dockyards is anything but flattering to us Englishmen. The day is assuredly looked forward to when France and England shall measure swords. When that day may come none can tell, that (in the expressive language of one of the great Dockyard officials to the writer) is one of the secrets of the Emperor's heart. Against that day England will do well to be prepared.

The Sea Approaches. Approaching Toulon from the sea the effect is not less striking than it is pleasing, if the day is fine. All the way round from Marseilles, as well as all the way round from Toulon to Nice, the coast is not unlike the old red sandstone ridges, and the harbour of Toulon has all the appearance of having been formed by nature in a playful moment. Stretching outside there are several bold promontories, and as you advance inwards a neck of land occupies the position of a breakwater, leaving you a comparatively narrow entrance. Passing the neck of land, the roads are surrounded by undulating spurs of the outlying Alps. You are reminded of the fine harbour of Halifax, Nova Scotia, but at the same time also of the great relative inferiority of the latter for the purpose of defence. Than the natural facilities for defence there is nothing superior to those of Toulon. To approach from any point is to come within range of covering forts, and to attempt to enter is to concentrate on you the cross fire of several hundred guns. And to enter and to hold any portion of the Roads is to become exposed to an extent and description of fire which it is idle to dream of any ship encountering. Not fewer than five hundred casemated guns will assail you *à fleur d'eau*, and as many more will fire upon your deck from elevations that you cannot possibly assail. No doubt a bold enemy might steal in noiselessly in the night, and, if moving about the Roads rapidly, might prevent the batteries getting the proper range, still his own fire would be quite as wild, and probably as harmless. Those only who have seen the difficulty of obtaining the proper elevations for distant firing in the daylight can form a safe opinion on the subject when an attack is conducted in the dark.* A night attack on Toulon would be futile; a day attack hopeless. The days of Sir Sidney Smith are not those of the present time, and if it is not pleasing to be told that Toulon is impregnable, there is more or less comfort in the reflection that impregnable positions are unnecessary in England, if the Navy were only well cared for.

The Land Approaches.

The land approaches of Toulon are as difficult as can be well imagined, and, commanded as they are by strong forts, access is impossible. Strong as the land approaches of Cherbourg are, they are not to be compared with those of Toulon, which on the landward side are as safe as those of Gibraltar. During the early days of the First Napoleon the land approaches were, however, carried; but that, in the first place, was by an enemy from within, not by an enemy from without; and, in the second place, what was done so very long ago is not likely to be repeated. What enemy by assault could carry a position resembling the Scotch or Welsh mountain slopes, the stones of which, without small arms or forts, would serve the purpose of the defenders? Until such enemy appears, Toulon on the landward side is safe, and its safety no Englishman need grudge his neighbours, because grudging is no use. Still, the destruction of any considerable portion of the railway between Marseilles and Toulon, or between Toulon and Nice, would cut off the coal supply. But that would be no easy task; indeed, it would be accomplished, if at all, at too great a price, because at the weakest point the natural means of resistance are great, and would, as a matter of course, be much improved. Coal is supplied just now in Toulon from the French and Belgian coal-fields, at a price nominally the same as that paid at the other Dockyards.

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* Take the case of the firing of the 600-pounder at the floating *Warrior* target at 1,000 yards from the beach at Shoeburyness. The writer was then present, and in a report published next morning directed attention to the indifferent practice. Out of the entire programme with the 600-pounder, and the 300-pounder, the 13·3-inch gun, and the 10·5-inch gun, only one shot struck the 14-feet target, the others slightly grazing the target or missing altogether. And yet the guns were laid by the most experienced Shoeburyness gunners, and the target was moored in smooth water. What then would be the practice in troubled water, and with the gunners to be found on board ships-of-war, firing under the double disadvantage of the motion of the platform-ship and of the target-ship?

The Harbour.

The harbour is in every respect worthy of the capacious Roads. First, there is the Port Marchand, next the Darse Vieille, then the Darse Vauban, and last the Darse Castigneau. The three last are basins of the first class, and, there being no tide in the harbour, the communication between them all may, if desired, be constant. At present Darse Vieille is occupied with ships in the third division, in which category there are very few. Darse Vauban, on the other hand, is occupied with ships in the second division; and Darse Castigneau is unoccupied, unless by ships whose machinery is adjusting, or which are replenishing their stores of coal and other things. There is not much in the arrangement, but nevertheless it is an eminently war one—ships for refit first entering Darse Vieille for inspection and the overhaul of masts and spars. These things attended to, they may afterwards take their turn, and haul into Darse Vauban for arsenal supplies, and last into Darse Castigneau, where all that remains will be provided.* We have no similar mode of expediting refit, but probably it would not be often requisite.

The Town. Toulon is no exception to the filthy rule applicable to all Dockyard towns. The houses are old, irregular, and uninteresting; the streets as narrow as that of Paternoster-row, and the abundant sewage is conducted to the harbour by open drains. In the absence of conveniences, such as those in Paris, no qualmishness is exhibited, and the lanes contiguous to the Prefecture reek with excrement. Business languishes. But one branch flourishes, and it is that of the cafés; the favourite beverage being strong coffee sweetened with cognac. There the civil, military, and naval branches are represented at all hours, and how civilians pay their way, leading such a life, is a mystery. When the Emperor visited Toulon, he was so struck with its filth and squalor that he gave directions for the laying out of a new town. The municipality loyally took the hint, and behind the old town there were laid out the Boulevard Napoleon, the Place Napoleon, the Boulevard Louis Napoleon, the Place d'Armes, the Jardin Public, and the Avenue de la Gare. But what Dockyard town has within it the means, the enterprise, or the liberality to retire from its slums and breathe the fresher air of boulevards, avenues, and jardins? Certainly not Toulon; for as well might the Emperor have suggested nothing of the kind, and the municipality saved their money. Toulon is as it was, and is likely to continue as it is.

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* It is from Castigneau that all embarkations of troops take place at Toulon.

Access to the Dockyard.

Access to the Dockyard, beyond the holiday privilege of Frenchmen, has not been usual of late years, but as several parties are known by the writer to have had the utmost scope, and for no particular reason, it follows that Toulon has been afflicted with a succession of whimsical and absurd Prefects. Two notable instances of exclusion may be named. Some two years ago when Admiral Elliott ventured on a communication to Sir John Pakington, which Sir Morton Peto and Mr. Lindsay thought erroneous, the latter sent two engineers to the French Dockyards for information. Those gentlemen were excluded from Toulon Dockyard—from the Castigneau and Mourillon portions. Another case of exclusion happened last year. The naval attaché at our Embassy in Paris proceeded to Toulon to see what was going on.* The Admiral and the other authorities received him, but to Castigneau or Mourillon he could not get without separate special orders from the Minister of Marine. He, of course, returned to Paris without seeing the Dockyard. Yet others were allowed to visit, just because it pleased the Admiral and the authorities to allow their doing so. The writer arrived at Toulon when the Admiral—Admiral Bouet Villaumez, now in command of the Mediterranean fleet—was in exceedingly good humour, but when the authorities—the Major-General de la Marine particularly—were in exceedingly bad humour. The Admiral received the writer at the Prefecture in the same manner as the other Admirals commanding at Brest and elsewhere had done, and went so far as to show him the plan of the proposed extensions at Castigneau and Mourillon. On taking leave, he said that he had given orders that the privileges of visit should extend over all, inclusive of Castigneau and Mourillon. The orders followed, but on being taken to the Major-General de la Marine were disallowed, unless to the usual holiday extent. To neither remonstrance nor representation would the Major-General de la Marine listen, and there was no choice but that of returning to the Admiral. The Admiral meanwhile having received a communication from the ungracious Major-General was reduced to the painful alternative of doing as the Major-General insisted or of breaking faith with a stranger—fairly and squarely, as the Americans would say—within an hour. The Admiral chose the latter course, and unnecessarily went so far as to deny that he had said anything at all before. Driven, however, from that position, he took refuge in the fact that when in England a few months before he had experienced the greatest difficulty in getting the sanction of the Admiralty for his visit to the *Caledonia*. Moreover, he added, French officers uniformly experience the same difficulty on all occasions, and therefore Englishmen visiting Toulon should also experience difficulty, the authorisation of the Minister of Marine notwithstanding. The shuffling was contemptible, and the writer could not forbear expressing what he thought. The end of the matter was that the writer telegraphed to the Minister of Marine, so that he (the Minister) might have an opportunity of vindicating his own authority; but waiting for the reply was needless, as the writer had visited the Dockyard some months before.

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* It is said that on one occasion Lord Clarence Paget was refused permission to go on board the *Gloire*. Surely in the presence of such facts as these it is scarcely honest for the Admiralty to pretend that they know very much about what France is doing. At Toulon the Admiralty intelligence is procured surreptitiously from the French boatmen, and cannot, therefore, at the best be very trustworthy. One of her Majesty's consuls, for the information of her Majesty's Government, obtained certain facts from the writer which he was precluded from obtaining for himself in his own consular district.

The General Plan of the Dockyard.

The general plan of the Dockyard is striking, but by no means free from criticism. Its great fault lies in the position chosen for wood shipbuilding, which obviously ought to be carried on in the most secure corner of the Dockyard. The combustibles should be where they are least likely to be burned by bombardment; but long-range shell fired into Toulon Dockyard would have a good chance of dropping into the Mourillon timber sheds, were they to fall short of the shipping in the lower roadstead, or the foundries of Castigneau. The blunder is remarkable; nevertheless it has this redeeming feature, that the Mourillon is detached from the other parts of the Dockyard, and a conflagration, therefore, would effect no more than a temporary suspension of wood shipbuilding and repairing. Still, had the wood shipbuilding part of the Dockyard been established in the merchant harbour, under the guns of Fort St. Catherine, or had the arsenal of Castigneau been established where the wood shipbuilding Mourillon is, comparative safety would have been secured for the timber; while Castigneau, established where Mourillon is, would at least enjoy exemption from burning by bombardment. Still, Frenchmen will urge that although Castigneau in the place of Mourillon might not be burned, its tools would be destroyed and the labour of the artisans impeded, the use of such tools and the services of such workmen being incomparably more useful in a time of war than any conceivable number of mere wood shipwrights or any conceivable quantity of rough timber. There is some force in the objection, but Frenchmen must remember that they are committed to the arrangement as it stands, change now being practically impossible; and therefore they are not without reason for being contented with the official manner in which things have been ordered for them. But to proceed with the general plan of the Dockyard. Mourillon occupies the inside of the neck of land which stretches across the entrance in the form of a breakwater. Shell consequently have only to be thrown to the other side of the neck of land to lead to the destruction of the great timber stores and wood shipbuilding premises. Standing in front of one of the row of covered building slips in Mourillon, the arsenal of Castigneau is in front at the other side of the lesser roadstead, and to the right across the same roadstead are Darse Vauban, Darse Vieille, and the merchant harbour. So, once more, the wood shipbuilding department of Toulon Dockyard is separated from the other departments by an arm of the sea. A similar arrangement at Portsmouth would involve the transfer of the wood shipbuilding department to the Isle of Wight or Southampton Water. Crossing from Mourillon to Castigneau, on the left of the entrance of the basin is the Parc au Charbon, the Magasins des Subsistances, and the arsenal, the basin being provided with three capacious docks. At the head of the Castigneau basin is the Boulangerie. Opposite the Boulangerie, but within the Darse Vauban precincts, are the magazine and the Arsenal maritime in the foreground of the basin, with the forge and rope-walk in the rear. Darse Vauban is also provided with capacious docks, an arrangement which admits of docking being proceeded with in either basin—that is, either in Vauban or Castigneau. Darse Vieille is as yet unprovided with docks, and will probably remain so. Further dock extension will be afforded at the head of Darse Castigneau, near the Boulangerie, and on the ground occupied by the Boulangerie, as well as across the lower roadstead at Mourillon. Such is the general plan of the Dockyard. Convenience has been steadily and successfully kept in view, and the economy of labour must be very great. It is perhaps not too much to affirm that by virtue of the mere arrangement of its parts, the Dockyard possesses as great facilities and resource for refit and repair as any two old-fashioned dockyards of like area, and therefore that the saving in all departments and all branches is equivalent to the saving incident to the suppression of one old-fashioned dockyard of like area. Of this there can be no doubt, that in Toulon Dockyard the entire wants of the French fleet could be provided for in any emergency, however serious that emergency might be.

The Workshops and Stores.

Entering the Dockyard from the Champ de Bataille, the handsome line of newly whitewashed buildings in front, and slightly to the right, is the forge. It differs from the forges of the other Dockyards in little more than in being new. It is of recent origin, and presents no novelty; double rows of blacksmiths' hearths in clusters running from end to end, with two or three heavy hammers and cranes for the heavier work. The number of hearths probably exceeds three hundred. Three hundred ringing anvils, and beside them six hundred stout workmen for the day, and as many for the night, may be taken to represent the blacksmith capability of the Dockyard, and a great capability it is. But lest it may be supposed that there is no use including night work, it may be well to state that, whenever there is urgent work in Toulon Dockyard, or in any French Dockyard, it proceeds without intermission day and night, Sunday and Saturday, until finished. There are no orders to the contrary, and never will there be any orders to the contrary, the French Dockyards being places to be used without reference to days or hours. The ropery behind the forge resembles all other roperies. There the stoutest cable may be spun; but all spinning is directed by superior order, and with scrupulous reference to the stock on hand. As the stock of cordage in our own Dockyards has not been taken for nearly fifty years, and no one knows what there is, nor what there is not, all kinds are spun in turns, and usually until the supply of raw material, whatever that may be, for each sort, fails. In front of the forge there is another line of handsome buildings, the Dockyard mast-houses. Half-a-dozen men are at work; and the stock of spars is as small as in the other Dockyards. Passing onward to the Arsenal de Castigneau, and through the rubbish of the extension near the Boulangerie, those buildings which there is no use to enter are, first, the coppersmiths' shop—and second the foundry. Cannon are occasionally cast in the foundry, but its great use is casting for the arsenal. The next fine building with the tall chimney is the engineers' department. It is well found in tools by Whitworth and others, but it is very much inferior to such establishments as Maudslay's in Lambeth, or Penn's at Greenwich. Still, it is amply sufficient for all the probable, as well as many of the merely possible, wants of the most trying war. Contiguous to the engineers' shop is the Montage. Passing now to the Mourillon, a fine frontage of building slips is presented, and in the rear a handsome range of wood shipwrights' shops. In one of these shops they have the Havre sawing and shaping tools, as at Lorient, Brest, and Cherbourg. Manual labour is economised to the utmost possible extent, although there is a superfluous supply of convict labour in the Dockyard. A little to the left of the wood shipwrights' shops are great timber sheds. You ask the reason of this unusual display of stock, and are told that in Toulon all timber is kept dry, and not wet as at Brest and elsewhere. Why this is so no one knows; but you are told that, although the wet timber answers best for ships' bottoms, the dry kept timber answers best for all other purposes.

The Basins, Docks, and Slips.

The basins, as before stated, are three in number—Darse Vieille, Darse Vaubar, and Darse De Castigneau. The total area, inclusive of the merchant harbour, is little short of 100 acres. But practically the Roads constitute one vast basin, and a very good basin too, there being no tide. The docks, inclusive of those in progress at Castigneau, are nine of the first class—in other words, nine ships of the *Warrior*, or even of the *Minotaur* length, could be docked at once. This unquestionably is one of the most formidable features of the Dockyard. The building slips of the first class are sixteen in number, but others for iron shipbuilding are in contemplation at Castigneau.

The Ships in Construction.

The ships in construction in Toulon Dockyard are the *Provence*, ironclad, bringing forward for commission, and the *Savoile* and *Revanche*, ironclads, nearly ready for launching. These are all ships with wood frames, and substantially they resemble the *Gloire*. There are also two cupola ironclad corvettes building—one named the *Taureau*, the other not yet named. Night and day, Sunday and Saturday, have the workmen been engaged on those two corvettes, and, no doubt, if the two ships building at Lorient are for the Confederates, so are the two cupola corvettes building at Toulon. In proportions and steam power they will resemble the two Birkenhead rams—*El Monassir* and *El Toussin*. Some unfinished wood frigates are at a standstill, as in the other Dockyards.

The Reserve of Guns.

The Toulon reserve of guns is very large, but most of the guns are of the 1798 and the 1810 patterns. A considerable number of breech-loaders, such as those on board the *Solferino* and *Magenta*, are also lying about with the breeches and muzzles boarded over. There are also not a few of the brass 4·80-inch guns. But the number of such guns at Toulon is not greater than at Rochefort and Lorient. The modern smooth-bore guns, which were the service guns before rifling, are now nearly all rifled, the practice being to send them, as it is found convenient, to St. Etienne, to undergo rifling and strengthening,* and, those things done, the guns are returned to the Dockyard. For the smooth-bore guns the rifling is in three shallow grooves, the width of the three being equal to half the circumference, and the pitch of the rifling appears to be rather high. In the guns, zinc button shot fit loosely, allowing considerable windage. Against the zinc buttons so little objection is made that they are adopted in the shot and shell of the breech-loaders, there being no compression of soft substance and no suppression of windage in the French as in the Armstrong breech-loader. The shallowness of the rifling is explained by the necessity for maintaining the strength of the guns;

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* To the general accuracy of the article in the *Edinburgh Review* on French guns the writer begs to give his testimony. That article to some extent anticipated what the writer proposed to say on the subject, but still the writer had an advantage over the Reviewer in personal examination, and has therefore been able to supplement the Reviewer's statements, particularly as regards breech-loaders and 10-inch guns. It may be further added that on board the *Invincible*, ironclad, the writer found four light field guns on the deck as part of the ship's armament.

but experiment in France has shown that shallow rifling is as serviceable as deep rifling, and accordingly the new wrought-iron guns, steel and brass guns, do not differ greatly from the cast-iron guns. Experiment in France has also shown what experiment has shown in this country—namely, that forms of rifling are practically unimportant, one being as good as another. The eight-groove brass guns have therefore no greater precision nor length of range than the three-groove cast-iron guns. It is, no doubt, to the shallowness of the French rifling, in comparison with the depth of our rifling, that the French guns of all sorts may be fired with relatively higher charges. Especially is this the case with cast iron guns, although there is reason to believe that French cast iron is an incomparably better article than English cast iron. Whether French cast iron is as good or better than Russian cast iron is not perhaps known, but it is the case that after the Russian war it was practically impossible to burst some of the Russian cast-iron guns at Woolwich. It also is the case that English cast iron is the very worst produced, the most unsuitable and worthless known to gunmakers.* It is very much to be regretted that the Ordnance Select Committee never thought of turning their attention to good cast iron, and to the rifling of cast-iron guns, because a serviceable and comparatively cheap class of guns might have been long since produced. The committee appear to have been led away by exaggerated opinions of their own importance, and to have pooh-poohed much that was worth investigating. There is rather a melancholy reflection—that, namely, that after all the old smooth-bore 68-pounders are the best guns we have.

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* Why English cast iron is the wretched stuff that it is, arises from the fact of inferior cast iron being exclusively in demand in England. Were superior cast iron ever to be in request for gun casting, it would no doubt be provided, although very considerable and very costly experiments would be necessary, unless on the part of the Carron Company and the Lowmoor Company. The best cast iron is made with charcoal: English cast iron is made with coal. Then there are recipes for mixing, which must be closely followed.

Forced Labour.

At work among cannon and shot was a gang of *forçats* on the occasion of the writer's visit. Some were wheeling old pattern cast-iron shot to the foundry, others taking guns to the armoury for the purpose of being sighted. Six months—the interval between the writer's visits to Toulon Dockyard—have worked wonders among the poor forced labourers. The numbers are fewer by nearly two thousand, and those remaining appear to be less fully occupied. What is the matter? you ask the guide involuntarily, and he is not in the least backward in reply. The *forçats* are not doing much because they cannot. The inclement season is too much for them, with their summer clothing, scanty food, and no warmth during night. Those to be seen crouching beside the wall seek the shelter of the wall, being too weak to go to work, and not ill enough to be sent to hospital. So France does not hold its forced labour in high esteem, does not render it as available as it might do, and thereby keep its expenditure down to the lowest point. No; France seeks the death of its *forçats*, be their crimes the lightest or the blackest. At one period it was otherwise. Under the Louis Philippe *régime* there were *forçats* at Brest and Rochefort also, because there was no transportation beyond the limits of the country. Under the Empire convict reformation has ceased to be attempted, and the incarceration of convicts within France has therefore ceased. Now Cayenne is the destination of all offenders without distinction, and there the average duration of life is six months only from the time of landing.* The *forçats* now in Toulon are the remnant sentenced under the old law, their sentences being for terms or life within France, and not without. Imperialism tolerates them, but nothing more. The wretched creatures are never unfettered, but are either in twos or in gangs from the day of their commitment until their sentences expire. The refuse of the ships-of-war forms an unseasoned, stale soup for them, and the biscuit of the navy all their other diet. It is cruel nourishment, because it is inadequate. And at night the poor creatures are chained down together on the wood benches, without bedding, without anything but their day clothing on their backs, supplemented by a thin, dirty rug. The stoutest heart fails under such treatment, and the most robust constitution is sapped under it. So it is intended. France desires that the remaining *forçats* should accept the alternative of Cayenne. Every month there are volunteers from the number, and soon there may be none remaining in Toulon or France. When, in the June of 1863, the writer visited Toulon 6,000 *forçats* were in the Bagne; in the February of the present year there were no more than 4,000. The 2,000, or as many of them as volunteered for Cayenne, have by this time survived the average period, and now are "where the wicked cease from troubling." Naples in its worst days perpetrated no wrong like this. It was horrible to endure what Poerio and others suffered, but they were fed, although fed filthily, clad, although clad filthily, and covered, without chains, although covered filthily. Naples never in this high-handed manner sought the death of its offenders, civil and political, without distinction or remorse. How many Englishmen, offenders, it may be, in some trivial matter, have suffered with unhappy Frenchmen heaven alone knows. So the declining employment of convict labour in the French Dockyards proves nothing more than the utterly indefensible and barbarous character of the French penal laws. The law presumes that every man who has offended is capable of offending still further, even to the taking of the Emperor's life, and accordingly the law is beforehand with them. It sends them to Cayenne and perdition.

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* The writer was credibly informed in Toulon that last summer a party of fifty *forçats* died within a week of their return from Cayenne to Toulon, so great was their prostration from the climate, although all were under twenty-five years of age.

Since the *coup d'état* political offenders have suffered indiscriminately with criminals.

At the establishment of Silver-hill, Cayenne, one of the most deadly, the mortality has averaged 40 per cent. per annum, some years nearly all the *forçats* dying from the deadly miasmas.

In 1856 all the *forçats* and missionaries died of yellow fever at the St. Marie and St. Augustine stations, the number exceeding 1,000.

Of 180 white *forçats* who arrived at St. George's in July, 1854, one half of the number died before January, 1855.

Steam Launches.

In reserve in Toulon Dockyard there is a class of small craft which is unknown in this country.* It is man-of-war launches, fitted with engines of six-horse power. Probably they are also in reserve at Cherbourg and Brest, but if so the secret is well kept. These steam launches are provided for the landing of an expeditionary force in an enemy's country, so as to keep the troops as short a time as possible under fire. The first experiment was made with them in Mexico, and it was so successful that orders were at once issued for the construction of a large number, and also for the adaptation of a large number of the store launches. When the steam launch is required for service, it is brought to the gangway on the frigate's deck, and while the tackles and gear are got ready the fire is lighted and steam got up. This occupies a very short time. The launch is then dropped alongside with half the usual complement of men on board, and from four to six flat-bottomed boats full of soldiers may be towed any distance at an average speed of six miles an hour. In Mexico, it is said, each steam launch towed an entire regiment in this manner; the flat-bottomed boats, of course, offering the least possible resistance to the water. Each steam launch carries a 4-pounder field gun on the bow and twenty rounds of common shell and case-shot ammunition. Inquiry in Toulon as to the eventual use of the steam launches is answered by a shrug of the shoulders and a knowing grin. The Admiralty would not err greatly in ordering a similar flotilla, because it has always been found awkward to provide such things when wanted in a hurry.

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* Steam launches have now been ordered for the *Minotaur* class of ships. A large number should immediately be provided. Indeed every ship in the service, down to corvettes, should have one boat at least propelled by steam.

The French Navy.* Speaking of these launches suggests an accurate statement of the effective French Navy, as it stood at the beginning of the present year. The statement is official, but its source cannot be divulged. It, however, no doubt corresponds with the latest authentic information obtained by our own Government. It is here given in the words officially put into the writer's hands:—

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* It is with extreme reluctance that the writer differs again from M. Dupuy de Lome. M. Dupuy de Lome recently made the following statement in the Corps Législatif.

After stating that the estimates for 1865 amounted to 126 millions, whilst in 1847 they were only 111 millions, he proceeded to state the nature of, and the motive for the increase:—

"First (he said) we come to a sum of two millions for the average addition of 70f. a year to sailors' pay; four millions for increased rations. The number of officers, which was 1,872 in 1847, is now 2,174; and the addition of 150f. a month made to the pay of the lower grades makes a total of 1,600,000f. The increased pay to the other corps of the Marine amounts to 1,010,000f. The necessary increase of salaries below 1,200f. costs 250,000f. The workmen in the ports, 24,000 in 1848, have been reduced to 22,850, but their pay has been raised from 1f. 70c. to 2f. 25c. per diem. Thus with 1,150 men less we have an increase of cost to the extent of 3,200,000f.; I must add that the work, better paid, is better done. The reserve destined to ensure a cheap transition from a peace to a war footing figures in the budget for 2,362,000f. By adding the expenses for the creation of two school-vessels, and of penitentiaries, the total amounts to 16 millions. The general inventory of the Marine drawn up in 1862 gives a figure of 1,200 millions for the whole material, whereas in 1848 it was only 900.

STEAM SHIPS.

| | | |
|---|---|---|
| Ships of the line ......... | 37 | One ship of which is building at Rochefort; one-third of the whole number of which are at sea, or ready for sea; the remaining third are in the second and third categories of the reserve. |
| Frigates .................. | 60 | Ironclads—Afloat, 8; building, 9; total ironclads, 17. Screw and paddle, at sea or ready, 16; reserve, 26; building, 1; total not ironclad, 43. |
| Batteries .............. | 21 | Ironclad large ships—Reserve, 9; ditto, ditto, building, 7; small, in store at Toulon, 5; total ironclads, 21. |
| Corvettes and Avisos... | 142 | |
| Gunboats .............. | 70 | One-third on service, the others in reserve. |
| Screw transports ...... | 50 | One-half on service. |
| Steam-ships—Total.. | 380 | |

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The fleet in activity is now worth 450 millions instead of 300 in 1848, and it has to be kept up and repaired. The Minister of Marine has to meet all these expenses with reduced resources. M. de la Tour has asked to know the programme on which the budget of the Marine would be constituted. It is that of 1857. It still subsists with slight modifications. The conclusions of the programme of 1857 were as follows:—There should be constructed, first, a transition fleet, composed of sailing vessels capable of being transformed; second, a swift fleet of war, composed of 40 ships of the highest type, 20 ordinary frigates for distant expeditions, 90 vessels of inferior rank, in all 150 bottoms; third, a transport fleet to carry 40,000 men and 12,000 horses—say 75 bottoms; fourth, a flotilla of small craft—say about 125. Lastly, there should be special vessels, about 30, for the defence of the ports. This gives a total of 380 vessels; and, adding 20 sailing vessels still kept for cheap transports, we reach the figure of 400.

SAILING SHIPS.

| | | |
|---|---|---|
| Ships of the line ...... | 7 | All hulks, prisons, or school ships; one an hospital in China. |
| Frigates .................. | 24 | One-third serving as transports; the others in reserve. |
| Corvettes, brigs, schooners, cutters, and transports. | 79 | About 50 on service; the others in reserve. |
| Sailing ships—Total | 110 | |

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That was what we had to do. Now, what have we done, and what remains to be done? The expense had been estimated at 214 millions for the fleet and 48 millions for the ports, and the Council of State recommended the execution of the works in fifteen years, starting from January 1, 1857, by means of annuities of 17 millions, to be paid according to the resources of the budget. We have received 126—we have still 137 millions to receive. How have we spent the money? The transition fleet is completely finished. For a moment it comprised 66 ships and 23 steamers—the figure is now 48, because the 23 ships of transition have been passed over to the transport fleet, which is thus more than complete. It numbers 79 ships instead of 75. Still we have 10 transports on the stocks, because our effective in this class must always be complete. Of our fleet of swift war vessels, 93 are finished out of 150; and of the 57 that remain 22 are either in dock or in course of completion afloat. The 93 finished comprise six ironclad frigates, 13 swift ships, 17 non-cuirassed frigates, and 57 vessels of inferior rank. Of the small flotilla we have 101 bottoms: we want 24 more. To sum up, 330 steam ships are finished, 45 are in dock, and we have remaining 104 sailing vessels of the old fleet. That makes a total of 434 vessels: 34 more than in the programme of 1857. The apparent excess is explained by the 43 ships of the transition fleet not counting as effective in the programme, and by the sailing fleet having still 84 vessels too many; on the whole, 127 vessels are doomed to disappear, and we are left with a deficiency of 93. It is to supply this deficit and to finish all the works anticipated in the 48 millions estimate that the 137 millions yet to be received by the Marine will be devoted. Without entering into too minute details, I may state that there is reason to be satisfied with the results already obtained. France has taken the initiative of all improvements, and has no cause for regretting the types she has adopted. Not that there is nothing left to be done. It took 200 years to perfect our sailing fleet, but at the present day progress is more rapid. 'Go ahead!' say the English and American; but we said, long before them, '*En avant!*' (Great applause.) The Count de la Tour has spoken of the *personnel* of our Marine, and calculated it at 100,000 men. I think the figure too high. Let us suppose a complete equipment of the 380 steam vessels, excepting one half of the avisos and flotillas; we must have 66,000 men and 2,540 officers. Then, if you at the same time equip twenty sailing vessels and the rest of the flotilla, you would want 9,000 men more. But, for a precipitated armament, in case of sudden war, the effective will be 2,540 officers and 66,000 sailors, 56,000 of whom on board and 10,000 ashore in the ordinary distribution. These men would not all be taken from the maritime inscription—our schools of cabin boys would furnish a part. The 64,000 men would be derived, a moiety from a recruitment, and a moiety from the inscription. The

### THE IRONCLADS AFLOAT.

| | | | | |
|---|---|---|---|---|
| *Magenta* | 52 | guns, | 1,000-horse | power* |
| *Solferino* | 52 | „ | 1,000 | „ |
| *Couronne* (iron) | 40 | „ | 900 | „ |
| *Normandie* | 36 | „ | 900 | „ |
| *Invincible* | 36 | „ | 900 | „ |
| *Gloire* | 36 | „ | 900 | „ |
| *Provence* | 36 | „ | 900 | „ |
| *Heroine* (iron) | 36 | „ | 900 | „ |

### THE IRONCLADS BUILDING.

| | | | | | |
|---|---|---|---|---|---|
| *Savoie* | 36 | guns, | 900-horse | power... | Toulon |
| *Revanche* | 36 | „ | 900 | „ ... | „ |
| *Surveillante* | 36 | „ | 900 | „ ... | Lorient |
| *Flandre* | 36 | „ | 900 | „ ... | Cherbourg |
| *Guyenne* | 36 | „ | 900 | „ ... | Rochefort |
| *Gauloise* | 36 | „ | 900 | „ ... | Brest |
| *Valoreuse* | 36 | „ | 900 | „ ... | „ |
| *Magnanime* | 36 | „ | 900 | „ ... | „ |
| *Taureau* (Cupola) | — | „ | 500 | „ ... | Toulon |
| Nameless Cupola | — | „ | 500 | „ ... | „ |

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maritime inscription this day shows an effective of 89,000 men. The men under forty and continually liable to be enrolled, are from 66,000 to 67,000; this enrolment collects from 4,500 to 5,000 every year. That makes, for the six years that the service lasts, about 30,000 men. You see, then, that all wants may be satisfied by the operation of the permanent enrolment, without having recourse to the second call, which requires a special decree, and is kept for an extraordinary resource. It remains for me to say a word on the habours of refuge. They are indeed capable of rendering great services to our shipping: but were I to tell you the total expense to which we shall be put for things of pressing utility you would certainly be alarmed. Much still remains to be done for the improvement of our great ports. At Brest there is only one dock into which an ironclad vessel can enter without landing her guns and other heavy articles, and the delay thus caused would be very disastrous in time of war. Large docks must therefore be built in several of our ports, and those works are being carried cn with great activity. Depôts of timber are also required where it can be kept dry, and for that purpose sheds must be provided. The expense of what we have to do at the different ports cannot be estimated at less than a little more than 40 millions, and the Minister of Marine necessarily considers that outlay as more urgent than that for harbours of refuge. The hon. M. Conseil has made some remarks relative to the conveyance of troops, but that is one of the most important services which the navy can render to the State. (Approbation.) That the transport of soldiers is not very agreeable to the officers of the vessel no one will deny; but all of them are well aware that it is a duty they have to perform, and they are proud to be of service to the country. (Renewed approbation). I do not think it necessary to enter into any further details, but if other explanations are wished for, I am at the command of the Chamber." (Approbation.)

* The engines of the ironclads, chiefly from the Havre works of M. Mazeline.

### THE RESERVE IRONCLADS.

| | | | |
|---|---|---|---|
| *Tonnante* ...... | Toulon ... | 16 guns | 225-horse power |
| *Devastation* ... | " | 16 " | 225 " |
| *Lave*........... | " | 16 " | 225 " |
| *Foudroyante* ... | Cherbourg | 16 " | 225 " |
| *Congreve* ...... | Brest ...... | 16 " | 225 " |
| *Saigon* ......... | Rochefort. | 14 " | 300 " |
| *Palestro* ...... | " | 14 " | 300 " |
| *Peiho* ......... | " | 14 " | 300 " |
| *Paixhans* ...... | " | 14 " | 300 " |

### IRONCLADS BUILDING.

| | | | | |
|---|---|---|---|---|
| *Protectrice*... | Bordeaux ... | 4 heavy guns | twin-screws | 150-horse powe |
| *Impregnable*. | " | " | " | 150 " |
| *Embuscade*... | " | " | " | 150 " |
| *Refuge* ...... | " | " | " | 150 " |
| *Arrogante*... | Nantes | " | " | 150 " |
| *Implacable*... | " | " | " | 150 " |
| *Opininatre*... | " | " | " | 150 " |

### THE TOULON IRONCLADS.

| | |
|---|---|
| No. 1 | The horse power and armament unknown. |
| " 2 | |
| " 3 | |
| " 4 | |
| " 5 | |

Lorient—1 Corvette and 1 Gunboat.

Bordeaux—1 Cupola Ram Corvette.

Total French ironclads of all descriptions, 42; the most backward of which may if necessary be in commission and at sea in the course of the present summer. If, however, the Confederates are to have four, the number will be reduced to 38.

**An Inveterate English Prejudice.** Stop any of your friends you choose in the street, tell him that you are fresh from a visit to the French Dockyards, that you have been on board all their ironclad ships and batteries, built and building, and that you have seen the breeches of the *Solferino's* guns unscrewed, &c.,—he is not surprised that you have; he is not afraid of Frenchmen; he is perfectly satisfied that we can thrash them any day they like to try, and that it is all over with the Emperor at home and abroad when he ventures on such a game. There is an inveterate English prejudice at the bottom of these opinions. There is a distrust of all that Frenchmen do, a blind confidence in ourselves. True, British troops expelled the French from Portugal and Spain, and triumphed over the First Napoleon at Waterloo. But in Portugal and Spain the French were in an enemy's country, which in war is always thought a trying evil, and at Waterloo the beaten army had been hastily got together with officers and men, from the heroic Emperor down, oppressed by the consciousness that the enterprise was desperate and unpromising. The French were beaten, but that is nearly fifty years ago. Since then two generations of Englishmen and Frenchmen have passed away. For almost fifty years the two nations have not crossed swords, and we, as regards the French, have rested on our laurels. For almost fifty years France, in the enjoyment of peace, has more than once reorganised its military and naval services, until the former is confessedly the first in Europe, and the latter has led the way with rifled guns and ironclads. These are the facts, and surely if they warrant any inference it is the one that we are as truly ignorant of French prowess as Frenchmen are of ours. We are untried—they are untried, and victory in a trial of strength would be no doubt, as it always is, with the best battalions. The prejudice may be said to arise from ignorance, not less of the actual state of things in England than in France, because those best acquainted with the present state of the English Navy in England and of the French Navy in France—Englishmen in both cases—tremble at the contemplation of a war, as at its commencement, whatever might happen at its close, it must inevitably, in the present state of our preparations, be the most disastrous on which England ever entered. That is the opinion of the British consuls in the French naval ports, and of Englishmen holding what may be called civil offices in the French Navy, of which latter there are not a few. These men are in the best position to form a judgment, and strange—nay, incredible as it may seem, from them will be heard the statement that in the French mind—the mind of officers of all ranks—there is an inextinguishable determination to avenge Waterloo. The opportunity is ardently desired, and will, it is confidently expected, arise some day soon. Then who among those who are arrayed on the other side, holding stedfastly to the doctrine whether we do anything or nothing in the way of systematic organisation, know aught of the readiness of England for defensive or aggressive war with France? Beyond knowing that the navy and the army absorb enormous sums annually, and learning from occasional articles in the newspapers that the *Warrior* is a prodigy, and that the French ironclads are failures, they are completely in the dark. The truth is, we at the present time are in as unsatisfactory a condition for a war with France as can well be imagined. For the writer's part, he can see nothing to prevent some dashing French officer—and there are such—bringing his fleet to anchor in the Thames within twenty-four hours from the time that the Cabinet of the Tuileries and the Cabinet of St. James's quarrel. No doubt, were we to know of his coming, he would meet with a hot reception, and probably would never take his ships back to France again. But who could divine his movements, who warn us of his approach? Were he expected at the Nore, all our ironclads would be needed to encounter him; and did he not turn up where expected, but where he was not looked for, who will foretell the consequences? The occupation of the Forth, the Mersey, or the Clyde, and the ransoming of Edinburgh, Liverpool, or Glasgow, would be a humiliation which might not lead to revolution, but would not fall much short of it. Englishmen may submit to many things, but dishonour is assuredly not among the number. With the resources of the greatest country in the world at their command, the Government would be without excuse.

Evil of this Prejudice.

There is an obvious evil in this prejudice of the gravest character. Let it be assumed that, whether we do anything or nothing in the way of systematic organisation, we are sure to defeat our enemies, and we at once anticipate the conclusion that we need give ourselves little or no trouble about defences or any other thing. This language, for which there is no warrant, which is the offspring of ignorance, and which, besides, is the quintessence of conceitedness, may in the end compromise us seriously. Indeed, as long as such language is held, especially in high places*—that is, by those in the press or otherwise, who direct the generally intelligent public opinion of this great country—the defence of England in a businesslike and yet economical manner is perhaps impossible. England defended as it might and ought to be, involves the overthrow of the present costly, cumbrous, irresponsible, and inefficient system, and therefore every word of praise bestowed upon our Warriors or our Dockyard labour charts staves off the much-to-be-desired period of adjustment and reform. The depreciators of French power and the exaggerators of our own as at present fettered will one day have much to answer for.

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* When Lord Palmerston was closely pressed by the Opposition on the subject of the Conference and the meaning attached to Earl Russell's statement about the readiness of the Channel Fleet, his lordship said that the British Navy is able to do anything and to go anywhere. Parliamentary buncombe! We have the six or seven ships constituting the Channel Fleet, and those ships away to the Baltic we would be defenceless, because without a Channel Fleet until a new one was created. It would be the case of the Baltic Fleet over again during the Russian war. This Lord Palmerston knows well enough, but he also knows that unless the British Lion were occasionally trotted out it would be impossible to continue popular.

## CHAPTER VII.

## THE FRENCH SHIPYARDS.

**Number and Character.**[*] The French shipyards are, in comparison with our own, few in number and unimportant. Practically, either the Thames Ironworks or the Millwall Ironworks present an extent of shipbuilding or of shipbuilding capability equal to the entire aggregate of the private French shipbuilding. The capability of either of the two great London shipyards cannot be rated at less than 40,000 tons, and frequently the Thames Company have had in hand 30,000 tons. Now, at the present time, there is considerably less than 30,000 tons in hand in all the first-class French shipyards. The French shipyards of repute are those of M. Normand, Havre; M. Gouin, Nantes; Scott and Co., St. Nazaire; M. Armand, Bordeaux; and that of the La Seyne Company at the head of Toulon harbour. The ordinary shipyards of the Thames, Mersey, Tyne, or Clyde are in many respects superior to the best French shipyards.

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[*] The extension of English shipbuilding since the outbreak of the American war has been very great. On the best authority it has been stated that there is between 500,000 and 600,000 tons of shipping in course of construction at the present time. The great bulk of that tonnage is of course for the increased accommodation of our own carrying trade; but the tonnage building for foreign Governments and blockade running, &c., is probably not less than 100,000 tons.

The Expectation of the Writer.

In making the round of the French shipyards the writer expected to arrive at the solution of a question of considerable importance; the question, namely, whether ships may be built in the French shipyards at a cheaper rate than in the English shipyards, and, consequently, whether eventually the British shipbuilder is likely to be driven from the market by the French shipbuilder. He has been to some extent disappointed. He found an indisposition to give the information necessary. For example, M. Normand's promises have proved barren; and M. Armand, at Bordeaux, had no desire to see the writer unless the writer desired to see him. Then M. Nillus, at Havre, received the writer with undisguised distrust. "What could a London newspaper writer mean by putting his nose into their places?" "How came the Minister of Marine to sanction such a thing?" Obviously the pursuit of knowledge was beset with difficulties. But those whose occupation it is to acquire information are not easily put down. As a general thing they manage to find out all that is worth knowing. It had come to the writer's ears in England that the steamers of the Transatlantic Company building at St. Nazaire would cost some £10,000 less than the same steamers building on the Clyde at Greenock. How far, then, was that statement true or not true? At Honfleur, wood ships with outfit—Baltic outfit—are built for £20 a ton. At Havre the price is higher, namely, £25 to £30 a ton. Assuming that Frenchmen would not buy ships in the Havre and Honfleur shipyards unless at a price approximating to that at the other French shipyards, it follows that between English and French prices there is not much to choose—it follows, in fact, from the French prices that ships are built cheaper in England than in

France. But price to the buyer and cost to the seller may be two different things. Was it possible to determine the relative profit of the French and English shipbuilder? Impossible, as all practical men will say; and a matter of no importance all will say. In ascertaining the price of ships at Havre and Honfleur, you learn all that is desirable, namely, that England is a cheaper market for ships than France, and that the French shipbuilder is never likely to undersell the English shipbuilder. At the same time, although it is impossible to determine the relative profit of the English and French shipbuilder, there is abundant reason to believe that in ordinary times the profit of French shipbuilding is very great, probably higher than in any other French occupation. Let us state those reasons. In the first place the French shipwright, although he may have been educated in the *Ecole des arts et·métiers*, and is as unexceptionable a handicraft as any in England or elsewhere, is nevertheless on the footing of a superior serf. He is not a freeman. When he offers himself for hire the service bill of health from his last employer must be a good one, otherwise he is not likely to find employment. He cannot do as he pleases nor go where he pleases, in the English sense of the words. Then he is utterly beneath the employer's heel—no strikes, combinations, or labour demonstrations are allowed by law. Last of all, the Minister of Marine may at any moment command his services where he likes and on his own terms. Thus there is a precariousness about the business of a French shipbuilder which the buyer of French ships must pay for. A shipyard which may be closed at any time by the simple ordering of a draft of the workmen to the Dockyards must secure the shipbuilder out of the returns. So, ships which in England might be bought for £15 a ton command £20 in France, although the French shipbuilder may grind his workmen at pleasure; and while, on the other hand, English workmen in shipbuilding may be said, without the least exaggeration, at the present time, to subject their masters to the grinding process. Another reason why French shipbuilding may be presumed as more profitable than English shipbuilding is to be found in the fact that whereas there is no excise on ships built in France, whether by Frenchmen or aliens, there can be no registry of British, United States, or Belgian ships under the French flag unless by the payment of 20 francs per ton for wood ships and 70 francs per ton for iron ships. These are large protective imposts, especially the 70 franc charge. Well might French shipbuilders undersell the British shipbuilder in the French market; but at the prices charged at Havre and Honfleur the British shipbuilder, after paying the heavy fee of registry, would perhaps undersell the French shipbuilders if only there were a demand for ships, which there is not. It will appear hereafter that the present generation of Frenchmen are not disposed to become shipowners, and that they are not made of the stuff of English shipowners.

English Shipbuilding in France.

How far the power vested in employers over workmen, and the consequent lower rate of wages current in the French shipyards when compared with wages in the English shipyards, will operate eventually in attracting English shipbuilding capital to France, it is impossible to say. With information on the subject, and in bad times, a considerable movement to the French ports may almost be anticipated. But one obstacle is in the way, and with the mass of English shipbuilders the presumption is that it would be inoperative. On the demise of a shipbuilder, resident and carrying on business in France, his property would be subject to division under the French law; his heirs would share alike. To some this would be a hardship, to others an affair of moonshine. To the hardworking practical English shipbuilder who thinks as much of one child as another, and will be thankful if in the end he bequeaths to each enough to give a start in the world, the equal division of property would be no bar to his settling down in the port of Havre, or any other French port. No doubt the liability of a draft from the shipyards to the Dockyards is also a consideration of some importance, but even were it to arise, it is not for a moment to be supposed that any war in which France would engage would prove of long duration. Instantly the whole power of France would be hurled at an enemy, and the success likely to attend such tactics is a guarantee of an early peace. But even were war to be prolonged, were France to fight a dozen years instead of one, what is there to show that there would be an abandonment of the shipbuilding interest by the Ministry of Marine. The presumption is that the shipbuilding interest would instantly and unceasingly engage the anxious consideration of those charged with the naval administration of the Empire. It would be determined whether France would be best served by the strenuous maintenance or the absolute abandonment of private shipbuilding, and in either case the shipbuilder would not suffer. The French Dockyards, although contrived to receive the shipwrights and others connected with shipbuilding throughout the country, would stand in need of the services of the shipbuilders not less than of their workmen. So a draft to the Dockyards implies the temporary absorption by the State of employer and employed. But inasmuch as the use of the French shipyards by the French Government in a time of war implies security from the mere fact of the diffusion of the shipbuilding by the Government, the probability on the whole is, that notwithstanding the creation of colossal Dockyards for the accommodation of all the French shipbuilding operatives, the shipyards will be retained in the Imperial service. In a word, shipbuilding capital has nothing whatever to fear from the French Government, either in war or peace. On all hands the openings are inviting: Havre, Nantes, Bordeaux, and Toulon being equally unexceptionable. Of course all persons are aware that the ships of any country receive in England an English registry on the same terms as English-built ships.

The Great Feature of the French Shipyards.

The French shipyards are marked by one great feature. They are cheap places. They make no show, and possess only the barest necessaries. A French shipbuilder gets his piece of ground, and very grudgingly erects a very mean wood fence round it. Had his countrymen, in the absence of coal, not a weakness for timber, the fencing of the piece of ground would probably not be thought of. The fencing of the piece of ground completed a saw-pit is dug, and the boards in excess of the fencing are good enough for the construction of a rude mould loft, and a still ruder office. Two Canadian backwoodsmen with the greatest ease would lay out and complete for occupation and business a French shipbuilding yard in a week, and a ten pound note would go a long way towards paying for the material used. A French iron shipbuilding yard is a trifle more elaborate. There are some old-fashioned tools, bought on advantageous terms at a sale in Liverpool or elsewhere, and those old-fashioned tools constitute the difference between a French wood-building and a French iron-building shipyard. Putting the two on a liberal footing; the capital sunk in a French wood shipbuilding yard is from £100 to £200, and the capital sunk in a French iron shipbuilding yard is from £200 to £500. On the Thames, and in England generally, the capital sunk in a wood shipbuilding yard is from £1,000 to £5,000, and in an iron shipbuilding yard from £5,000 to £25,000. On English iron shipbuilding yards of the larger classes the capital sunk ranges from £50,000 to £250,000. The difference between the French and English shipyards is remarkable as regards investment. The more money an English shipbuilder makes the more he invests in brick and mortar and in leasehold land, if freehold happens to be beyond his reach. It is difficult to say what a French shipbuilder does with his surplus profit, but it is clear he does not spend it on his premises. Upon the English shipbuilder opinion presses strongly: he is nobody unless he makes a show, and, to tell the truth, the greater show he makes the more he is run after, and the better his business prospers. Upon the French shipbuilder no such influence operates. He looks no farther than results—and the French public look no farther than results. Frenchmen measure the shipbuilder by his works, and by those only. M. Normand of Havre, for example, is the greatest shipbuilder of France, if not of Europe, in the estimation of all Frenchmen, although of late years he has been the least enterprising of all French shipbuilders. But he has shown in years gone by what he could do, and that is enough for France. Were he to lease a hundred acres, and to cover it with shipbuilding implements, he would not be a whit more thought of, and his credit, neither with the public nor his banker, would stand higher. This is a remarkable peculiarity of French sentiment as distinguished from English sentiment. And on the whole it must be confessed that the French are right and we wrong. In looking at the completeness, orderliness, and extent of an English shipyard we form an erroneous judgment. We might just as reasonably judge character by the dress people wear or the houses they inhabit. Up to a certain point it follows that those who fare sumptuously and are clothed in fine linen are the right sort of persons, just as up to a certain point all are Christians who go to church; but as it is the case that there are those who go to church and who occupy a position for the purpose of deception, there may be shipbuilders who spread out in all directions to disguise their pinched and failing circumstances. Our English standard is obviously a false one,—the French standard honest and unexceptionable. Frenchmen contract with M. Normand if they want a ship as strong and enduring as a wood ship can be; if they want a cheaper ship they go to Honfleur. Englishmen contract with so-and-so because he is getting on, and pass over another firm because they appear to be doing very little. The French keep their eye on what they want; we give our attention to the individual, or firm, and practically lose sight of the ship altogether. The French seem to know instinctively, although they are not much of a shipping people, that you may build a ship anywhere that you lay down the material just as you may build a mansion anywhere with brick and mortar; we seem to fancy that the material is nothing, and are very prone to be imposed on by a champagne luncheon in the mould loft, or a spread on board ship after running the measured mile at the Lower Hope or on the Maplin.

Vested Capital Economically Considered.

Admitting all that is to be advanced in the way of showing the necessity of compliance with a prevailing custom, it will nevertheless be well to push the subject a step further in the hope of its receiving the attention that it merits. Returning to our previous figures, a French wood shipbuilder starts and goes on with a dead weight investment in plant, &c., of £200, and an English wood shipbuilder with a dead weight of £1,000. In iron shipbuilding the Frenchman starts and goes on with a dead weight investment in plant, &c., of £500, and an English iron shipbuilder with a dead weight investment of £5,000. Obviously the differences would furnish the French shipbuilders with an ample fund for the prosecution of their business, while the English shipbuilders cannot stir without a fund in excess of all their outlays. In other words, wood and iron shipbuilding in France is carried on with a half—nay, a quarter of the capital required in England, £1,000 in France going as far as £2,000, or even as far as £4,000 in England. In other words, men precluded from engaging in shipbuilding in England might carry on an extensive business in France, and men carrying on an extensive business in France would not have sufficient means to embark in business in England. Vested capital up to the point without which business could not be prosecuted is the French rule, and the effect of adherence to the rule is that a man's resources are in no degree misapplied or dissipated. On the other hand, vested capital beyond the point absolutely required is in effect sheer waste, and there is no better established fact as regards business failure than the one that commercial shipwreck more frequently arises from the lock-ing up of means in non-essential things than by the operation of any or even of all other causes. The merchant is cramped by overstock, and the shipbuilder —the English shipbuilder—by worthless acquisitions or additions. Happily or unhappily for us, periods of extreme commercial pressure are separated by considerably lengthened periods. Were they occurring more frequently the severe lessons of improvidence would not be so often thrown away.

Unsatisfactory State of English Shipbuilding.

Of the generally unsatisfactory state of English shipbuilding very little doubt is entertained among those who know anything of the shipbuilders. English shipbuilding is the sport of two sets of influences not only calculated to retard the advancement of shipbuilding science, but which eventually may endanger the stability of the English shipbuilding interest. Archbishop Whately somewhere stated that Dublin was once the seat of a great shipbuilding trade, but that chiefly through differences between employer and employed the trade was absolutely destroyed. At present the relations between English shipbuilding workmen and their masters are in the incipient state which led to the overthrow of Irish shipbuilding. There are perpetual differences, and, to tell the truth, the workmen are frequently most unreasonable. Sometimes, not contented with unreasonable demands inside the yards, foremen are set upon and money extorted from them under the threat of personal violence.* This is not a healthy state of things. Much may be borne by employers in a season of unexampled prosperity like the present, but prosperity in shipbuilding and in shipping generally has its periodical reverse. It would be ungracious to point out what may then reasonably be supposed to happen. Let it suffice to state that it is desirable to elevate the character of the English shipyard workman by that most practical of all means, the amelioration of his condition. On the Isle of Dogs, for example, there ought to be some counter attraction to the public-house and the low forms of entertainment which are in favour. The providing of this by the employers would be easy of attainment. Step by step they might arrive at a good understanding with their workmen—an understanding such as that which has long subsisted between employer and employed in Lancashire. Looking no higher than their own pecuniary interests, the employers should understand that in the main employer and employed are intimately concerned in each other's welfare. They should also understand that the initiative is with themselves. Incalculably better as the condition of the English workman is than that of the French, the American workman is further ahead of the Englishman than the latter is of the Frenchman.* If the French workman is

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* A case of this kind was before one of the police magistrates the other day, and it was given in evidence that foremen on the Isle of Dogs were continually subject to those outrages.

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* From a small volume—*The American Lawyer and Business Man's Form Book*—a book that ought to be in the hands of all interested in the welfare of the working classes of the United Kingdom, I make the following extract under the head "Illinois." What is true of Illinois is true, with more or less variation, of all the States of the American Union, North and South:—

*Exemptions.*

The wearing apparel of every person shall be exempt from sale on execution, writ of attachment, or distress for rent, necessary for use.

The following property, when owned by any person being the head of a family and residing with the same, shall be exempt from levy and sale on any execution, writ of attachment, or distress for rent, and such articles of property shall continue so exempt while the family of such person or any of them are removing from one place of residence to another in this State, viz.:—

1. Necessary beds, bedsteads, and bedding; the necessary utensils for cooking; necessary household furniture, not exceeding in value fifteen dollars; one pair of cards,

a superior kind of serf, the English workman is almost a hopeless being, while the American workman enjoys the benefit of laws framed for his benefit as well as for the good of those who socially are superior to him. Sickness or want of employment reduces an English ship-

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two spinning-wheels, one weaving-loom and appendage, one stove and the necessary pipe therefor, being in use or put up for ready use in any house occupied by such family.

2. One milch-cow and calf; two sheep for each member of the family, and the fleeces taken from the same, or the fleeces of two sheep for each member of a family which may have been purchased by any debtor not owning sheep, and the yarn and cloth that may be manufactured from the same; and sixty dollars' worth of property suited to his or her condition or occupation in life, to be selected by the debtor.

3. The necessary provisions and fuel for the use of the family for three months, and necessary food for the stock hereinbefore exempted from sale, or that may be held under the provisions of this act.

When any lot not exceeding ten acres shall be appropriated and used as a burying-ground, and shall be recorded as such in the recorder's office of the county, it shall be exempt from all taxes: and when sold in lots for burying the dead, the said lots shall not be subject to execution or attachment; provided that no person shall hold more than one-eighth of an acre exempt from execution.

When in any case the head of a family dies, deserts, or ceases to reside with the same, the said family shall be entitled to retain the property above exempted, free from levy and sale on execution.

*Mechanics' Lien.*

Persons furnishing labour or materials in repairing or erecting any building, shall have a lien on the building and lot or crop of land on which the same shall be erected.

To enforce such lien, suit must be brought within six months from the time that the last payment should have been made.

Landlords have a lien on growing and grown crops for their rent.

*Homestead Exemption.*

In addition to the property now exempt by law from sale under executions, there shall be exempt from levy and forced sale, under any process or order from any court of law or equity in this State, for debts contracted from and after the fourth day of July, A.D. 1851, the lot of ground and the buildings thereon occupied as a residence, and owned by the debtor, being a householder and having a family, to the value of one thousand dollars. Such exemption shall continue after the death of such householder, for the benefit of the widow and family, some or one of them continuing to occupy such homestead until the youngest child shall become twenty-one years of age, and until the death of such widow; and no release or waiver of such exemption shall be valid, unless the same shall be in writing, subscribed by such householder, and acknowledged in the same manner as conveyances of real estate are, by law, required to be acknowledged.

No property shall, by virtue of this act, be exempt from sale for non-payment of taxes on assessments, or for a debt or liability incurred for the purchase or improvement thereof, or prior to the recording of the aforesaid conveyance or notice.

If, in the opinion of the creditors or officer holding an execution against such householder, the premises claimed by him or her as exempt are worth more than one thousand dollars, such officer shall summon six qualified jurors of his county, who shall, upon oath, to be administered to them by the officer, appraise said premises, and wright to beggary and destitution in a few days, or weeks at most. Men whose well-being, and the well-being of whose families, is sustained by a thread so

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if, in their opinion, the property may be divided without injury to the interest of the parties, they shall set off so much of said premises, including the dwelling-house, as in their opinion shall be worth one thousand dollars, and the residue of said premises be advertised and sold by such officer.

In case the value of the premises shall, in the opinion of the jury, be more than one thousand dollars, and cannot be divided, as is provided for by this act, they shall make and sign an appraisal of the value thereof, and deliver the same to the officer, who shall deliver a copy thereof to the execution debtor, or to some one of the family of suitable age to understand the nature thereof, with a notice thereto attached, that, unless the execution debtor shall pay to said officer the surplus over and above one thousand dollars on the amount due on said execution within sixty days thereafter, such premises will be sold.

In case such surplus, or the amount due on said execution, shall not be paid within the said sixty days, it shall be lawful for the officer to advertise and sell the said premises, and out of the proceeds of such sale to pay such execution debtor the said sum of one thousand dollars, which shall be exempt from execution for one year thereafter, and apply the balance on such execution: *Provided*, That no sale shall be made unless a greater sum than one thousand dollars shall be bid therefor; in which case the officer may return the execution for the want of property.

The costs and expenses of settling off such homestead as provided herein shall be charged and included in the officer's bill of costs upon such execution.

*Collection of Debts.*

ARREST.—When any debtor shall refuse to surrender his estate, lands, goods, or chattels, for the satisfaction of any execution which may be issued against the property of any such debtor, it shall and may be lawful for the plaintiff or his attorney or agent to make affidavit of such fact before any justice of the peace of the county; and upon filing such affidavit with the clerk of the court from which the execution issued, or with the justice of the peace who issued such execution, it shall be lawful for such clerk or justice of the peace, as the case may be, to issue a *capias ad satisfaciendum* against the body of such defendant in execution.

The defendant may board out his debt in gaol at one dollar and fifty cents per day.

ATTACHMENT.—If any creditor or his agent shall make complaint, on oath or affirmation, to the clerk of the circuit court of any county in this State, that his debtor is about to depart from this State, or has departed from this State, with the intention in either case of having his effects and personal estate removed without the limits of this State, to the injury of such creditor, or stands in defiance of any officer authorised to arrest him on civil process, so that the ordinary process of law cannot be served on such debtor, and that the debtor is indebted to him in a sum exceeding twenty dollars, specifying the amount and nature of such indebtedness, such creditor may sue out a writ of attachment against the debtor's lands and tenements, goods and chattels, rights and credits, moneys and effects, of what nature soever, or so much as will satisfy the debt sworn to, with interest and costs.

When any creditor, his agent or attorney, shall make oath or affirmation before any justice of the peace in this State, that any person, being a non-resident of this State, is indebted to such creditor in a sum not exceeding fifty dollars, such justice may issue an attachment against his personal estate.

Attachment may issue, in the case of a non-resident, against all his property for a sum exceeding twenty dollars, from the clerk of the circuit court of any county.

delicate and precarious, cannot reasonably be any other than the ruffians that so many of the English shipwrights really are. American shipwrights are a superior class of men, and they are secured against the possibility of immediate destitution. Secure the English shipwright in the same manner and hold genial intercourse with him, and assuredly for once the Ethiopian will change his skin and the leopard his spots. The second set of influences is that of the impracticable merchants or shipowners with whom the English shipbuilder has to deal. As a general rule, an English merchant or shipowner does precisely with his ship as with his house. His ship must be an embodiment of all his whims. He has certain fancies, and those he carries out, or requires to be carried out. Necessarily, such shipbuilding does not as a rule promote the development of shipbuilding science. On the contrary, it has a retarding, because degrading and demoralising, effect. It has been said of Mr. Scott Russell—and if there is truth in the statement the course is highly creditable to him—that he has in some cases positively refused to do certain things desired by the merchant or shipowner, he thinking that his reputation as a naval architect would by so doing suffer. The French merchant and shipowner is even more intolerable than the English. After a French shipowner has perplexed himself until there is absolutely nothing more to think of, he usually ends by afflicting the ship's cabin with his own portrait in oil, or that of his wife or mistress. More rational than either French or English, the American merchant or shipowner enters the shipbuilding market and says he wants a ship to do certain things, and after the contract is entered into he waits with patience until the ship has been provided, leaving the shipbuilder to do as he likes, under the inspection of an agent, who is simply responsible for the quality of the material used. These observations are made in the hope that the English shipbuilder will prepare for the rainy day that is sure to overtake him. He should know his workmen more intimately than he does, and then his workmen would be less unreasonable and disposed to rowdyism than they sometimes are.

## CHAPTER VIII.

## HAVRE.

M. Normand's Yard.*

M. Normand's yard is the only shipbuilding yard in Havre, but there are several yards of lesser note across the Seine at Honfleur. A guide from the Hotel of France accompanies you to the premises, and M. Normand, jun., is on the point of leaving for the Saturday half-holiday. He receives you in a most kind manner, and his worthy father spends the evening

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* A good offset to the Havre and Honfleur shipyards is that of the Clyde. The *Morning Journal* of the beginning of the year published a statement of the Clyde shipbuilding from the 1st January to the 31st December, from which the following is an abstract. The advocates of public establishments in England will find its digestion difficult:—

Messrs. W. Denny Brothers head the list in tonnage with the *Japan*, now the Confederate privateer *Georgia*, of 700 tons; the *Princess Alphonso*, of 2,000 tons, for a Spanish firm, to run between Spain and Cuba; the *Infanta Isabel*, of like dimensions, and for the same trade; the *Orissa*, 500 tons; the *Burmah*, 1,025 tons; the *Arabia*, 1,027 tons, for the British India Steam Navigation Co.; and the *Scotia*, 872 tons—all of which are screw steamers; and the paddle steamer *Defiance*, 450 tons, for Messrs. Gladstone, Wylie, and Co., to be employed as a tug on the Hooghly, in India. Total, 8 steamers, with an aggregate of 9,274 tons.

Messrs. Scott and Co. follow with six steamers having a total of 9,100 tons: the paddle steamers of which are the *Washington* and *La Fayette*, of 3,400 tons each, built for the Transatlantic Company, and the *Constance Decima*, 400 tons, which was intended to run the blockade; and three screws: the *Milani*, 570 tons, for Italy; the *Vartry*, 530 tons, for Messrs. T. Edington and Co.; and the *Albion*, 800 tons, for the East Indian trade.

Next come Messrs. Caird and Co., who built one screw and seven paddle steamers, 7,452 tons in all—the largest of which was the screw steamer *Germania*, 2,500 tons, for the German line of steamers to New York. The others were the *Alexandria*, 530 tons, for the London and Brighton Railway Co.; the *Lord Gough*, 770 tons, and the *Lord* with you at the hotel. Years ago M. Normand was not merely the first shipbuilder in France, but in Europe. He might be so yet, but he will not. Still, he takes the deepest interest in English shipbuilding, inquires about everything, and after every one. You tell him all you

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*Clyde*, 750 tons, for Messrs. Lewis Potter and Co.'s Dublin line; the *City of St. Petersburg*, 700 tons, and the *Nola*, 700 tons, both for blockade running; the *Snaefell*, 752 tons, owned by the Isle of Man Steam Packet Co.; and the *Alfred*, 750 tons, for the Steam Navigation Co., to ply between Bristol and Cork.

Messrs. J. and G. Thomson turned out one paddle and five screw steamers, in all 7,150 tons; the paddle steamer being the splendid *Iona*, 500 tons, built for Messrs. D. Hutcheson and Co.; and the others, the *Corsica*, 1,100 tons, for Messrs. Burns and M'Iver's New York line; the *Tripoli*, 2,000 tons, for Messrs. G. and J. Burns's Mediterranean line; the *Pampero*, 1,000 tons, which has been seized on suspicion of being intended for the Confederate service; the *Southern Cross*, 750 tons, for the Tasmania Steam Navigation Company, and intended for the Australian coasting trade; and the *City of Adelaide*, 1,800 tons, for the same trade, but belonging to the Australian Steam Navigation Company.

Fifth in order as regards amount of tonnage are Messrs. A. Stephen and Sons, who have launched one screw and two paddle steamers, and six sailing vessels, of the united tonnage of 6,810. The first was the *Sea King*, 1,200 tons, for the China trade; the next two were the *Presto*, 400 tons, and the *Dare*, 500 tons, both to run the blockade; while the sailing ships were the *City of Cashmere*, 1,000 tons, for Messrs. G. Smith and Son's Calcutta line; the *Severn*, 900 tons, for the London and Australian trade; the *Eliza Shaw*, 820 tons, for the Liverpool and China traffic; the *Bothwell Castle*, 650 tons, for Messrs. T. Skinner and Co., to ply between Glasgow and Singapore; the *Pembroke Castle*, 540 tons, owned in Wales, and intended to sail between Valparaiso and Swansea; and lastly the *Woosuny*, 800 tons, for the East Indian trade.

Messrs. Tod and M'Gregor launched five screw steamers (6,810 tons), the largest of which was the *City of London*, 2,560 tons, for the Inman line to New York; the *Britannia* and the *Caledonia*, each 1,360 tons, for Messrs. Handyside and Henderson's Anchor line to America; the *Princess Royal*, 780 tons, belonging to Messrs. M. Langlands and Co., and plying between this city and Liverpool; and the *Magnetic*, 750 tons, for the Belfast Steam Ship Company.

From the building-yard of Messrs. R. Steele and Co. proceeded two screw steamers and five sailing vessels, comprising 6,508 tons. The steamers were the *Barwun*, 450 tons, for the Australian trade; and the *Peruvian*, 2,500 tons, for Messrs. J. and A. Allan's Canadian Line; while the sailing ships were the *Waverley*, 1,000 tons, to run to the West Indies; the *Yah Shing*, 300 tons, for China; the *Serica*, 708 tons; the *Young Lochinvar*, 750 tons, for the Chinese trade; and the *Taeping*, 800 tons, for the East Indies.

Messrs. R. Napier and Son sent out one screw ironclad ram, the *Ralf Krake*, 1,246 tons, for the Danish Government; and the *Stirling*, *Warwick*, *Roslin*, and *Pembroke Castles*, sailing ships of 1,200 tons each, for Messrs. D. Currie and Co.'s Calcutta trade; the total tonnage from this yard being 6,046 tons.

Nine vessels were launched by Messrs. Barclay and Curle—namely, one paddle and four screw steamers, together with four sailing vessels, the tonnage of the whole amounting to 5,986 tons. The paddle steamer was the *Victory*, 260 tons, for the river traffic; the screws were the *Emily*, 480 tons, for the blockade; the *Vienna*, 750 tons, to ply between Leith, Hull, and Hamburg; the *Albatross*, 750 tons, for Australia; and know, and regret that you cannot tell him more. Why is such a man, you ask yourself, standing still, and not leading a profession in which for half a century he has been conspicuous. Physically and intellectually he is as well able as ever he was, and Havre and France

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the *Seamew*, 96 tons, for Campbeltown; while the sailing vessels were the *Ann Dorothea*, 500 tons, owned in London, and to sail to the West Indies; the *City of Amoy*, 1,000 tons, for Messrs. G. Smith and Sons; the *Nagpore*, 1,200 tons, for the East Indian trade; and the *Montrose*, 1,000 tons, for the same trade.

Messrs. C. Connell and Co. launched one screw and one paddle steamer, and five sailing vessels, the total tonnage being 5,215. The screw steamer was the *Genova*, 405 tons, for Messrs. Handyside and Henderson's Mediterranean line; and the other steamer was the *Mary Ann*, 440 tons. The sailing vessels were the *County of Lanark*, 500 tons, and the *County of Ayr*, 520 tons, for Messrs. R. and J. Craig; the *City of Brussels*, 1,000 tons, for Messrs. G. Smith and Sons; the *Roslin Castle*, 700 tons, and the *Lochleven Castle*, 650 tons, for Messrs. T. Skinner and Co.

Messrs. Blackwood and Gordon launched two paddle and seven screw steamers, with a tonnage of 4,825. The former were tugs, being the *Conqueror*, 200 tons, and the *Bulldog*, 378 tons—the first for the Clyde, the other for Calcutta, but both belonging to the Clyde Shipping Company; while the latter were the *Princess Alexandra*, 720 tons; the *Osborne*, 500 tons, owned in Leith; the *City of Launceston*, 500 tons, for the Australian Steam Navigation Company; the *Alexandra*, 800 tons, for the same traffic as the *City of Launceston*; the *Wellington*, 550 tons, for the New Zealand Steam Navigation Company; the *Tuskar*, 550 tons, at present running between Cork, Waterford, and this city; and the *Faen-Fze-Fee*, 627 tons, for China.

Messrs. T. Wingate and Co. built one paddle and three screw steamers, and also two steam dredges. The paddle steamer was the tug *Fokien*, 450 tons, which is to be employed in China; the *St. Lawrence*, 720 tons; the ——, 700 tons; and one hopper barge of 500 tons for the Tyne; and two steam dredges of 1,200 tons each, the one for the Tyne, and the other for the Clyde. The total tonnage of these vessels was 4,770 tons.

From Messrs. W. Simons and Co.'s building yard two screw and five paddle steamers were launched, with a united tonnage of 4,400. Of the screw steamers, the one was the *Little Ada*, 600 tons, to run the blockade; the other was the *Cormorin*, 500 tons, for the British India Steam Navigation Company. The paddles were the *Christopher Colombo*, 750 tons, to run as a mail steamer between Genoa and Spain; and the *Marco Polo*, 750 tons, and the *Favio Giulio*, 700 tons, both for Italy; and the *Julia*, 600 tons, and the *Will o' the Wisp*, 500 tons, both to run the blockade.

Messrs. J. Reid and Co. sent out one screw steamer and four sailing vessels, the total tonnage of which was 4,350. The steamer was the *Maria Pia*, 600 tons, for the Lusitania Steam Navigation Company; while the sailing vessels were the *Merwanjee Framjee*, 1,100 tons, for the Bombay trade; the *Jessica*, 600 tons, to ply between Liverpool and the East Indies; the *Ophelia*, 1,200 tons, for the same trade and owners; and the *Hindostan*, 850 tons, for the same trade, but different owners.

Then follow Messrs. A. and J. Inglis, with a tonnage of 3,210, which is made up of one paddle and four screw steamers; the largest of which was the paddle steamer *City of Brisbane*, 850 tons, for Australia. The others were the *Blanche*, 300 tons, for Mr. H. L. Seligmann, and at present sailing to France; the *Lady Bowen*, 700 tons, for the Queensland Steam Navigation Company; the *Euphrates*, 800 tons, for the British India Steam Navigation Company; and the *Laurel*, 560 tons, for Messrs. T. Cameron and Co.'s Londonderry line.

respect and honour him as much as at any previous period. He, however, is doing nothing, or next to nothing. He might build ships by the score if inclined, and his credit must stand as high as any French shipbuilder's in commercial and banking circles. But he

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Messrs. L. Hill and Co. launched one screw and two paddle steamers, and two ships, of the total of 3,205 tons. The screw-steamer was the *Penola*, 600 tons, for Australia; the paddles were, the *Thistle*, 663 tons, for Messrs. T. Cameron and Co.'s Londonderry line; and the *Janet Tennant*, 440 tons, for the West Indies; while the ships were the *Victory*, 1,200 tons, for Messrs. Potter, Wilson, and Co.'s New Zealand line; and the *South-Easter*, 302 tons, for New York.

Messrs. A. M'Millan and Co. launched six sailing vessels, of 3,117 tons. They were the *Surinam*, 524 tons; the *Madras*, 704 tons; the *Mauritius*, 720 tons, all belonging to Mr. John Kerr, Greenock (the first to sail to the West Indies, the others to the East Indies); the *La Plata*, 440 tons, and the *Parana*, 435 tons, for Messrs. Donaldson Brothers, to sail to South America; and the *Miss Kilmansegg*, 294 tons.

Messrs. Henderson, Coulbourn, and Co. sent out five screw steamers with a tonnage of 3,113: namely, the *Alberta*, 850 tons; the *Alexandra*, 500 tons, for Australia; the *Tirreno*, 763 tons, for Italy; the *William De La Rue*, 475 tons, for Mr. H. L. Seligmann, to run to France; and the ——, 500 tons, for China.

Messrs. Smith and Roger launched one ship and one screw steamer, with a tonnage of 3,000. The steamer was the *No.* 90, 1,500 tons, for London, and the ship the *Agamemnon*, 1,500 tons, for the Liverpool and East Indian trade.

Next follows Mr. A. Denny with three screws and two paddle steamers, with a total of 2,404 tons. Of the screws, one was the *Elluco*, 120 tons, for Santander; another the *Cheduba*, 700 tons, for the British India Steam Navigation Company; and the last the *Irene*, 980 tons, for the Royal Netherlands Steam Navigation Company; and the paddles were the *City of Dunedin*, 464 tons, for Australia, and the tug steamer *Charles Edward*, 140 tons, for Queensland.

Next comes Mr. J. G. Laurie, with a tonnage of 2,270, consisting of two screw steamers: one, the *Otago*, 850 tons, for the Intercolonial R.M.S.P.A.; the other, the ——, 720 tons: and one ship, the *Edinburgh Castle*, 700 tons, for Messrs. T. Skinner and Co.'s East Indian line.

Messrs. Randolph, Elder, and Co. sent out the paddle steamer *Quito*, 1,400 tons, for the Pacific Steam Navigation Company.

Messrs. Duncan and Co. launched the paddle *Teenaching*, 300 tons; and the ship *Appleton*, 1,000 tons, the latter for the London and Calcutta trade.

Messrs. Denny and Rankin launched the *City of Dunedin*, 1,100 tons, for Messrs. P. Henderson and Co.'s New Zealand line.

Mr. T. B. Seath built one paddle and three screw steamers, and one sailing vessel, with a tonnage of 964. The paddle was the *Royal Middy*, 100 tons, belonging to this city; and the screws were the *L'Artibonte*, 250 tons; the *L'Esterre*, 214 tons; and the *Mariani*, 250 tons, for Hayti. The sailing vessel was the *Protector*, 150 tons.

Messrs. Arthur launched the *Bushire*, 800 tons, for the British India Steam Navigation Company.

Messrs. M'Nab and Co. sent out two screw steamers, with a tonnage of 820 tons. The largest, the *Beatrice*, 500 tons, for Mr. H. L. Seligmann; the other, the *Rhoda*, 320 tons, for the Mediterranean.

Messrs. Barr and Shearer come next with the *Red Deer*, 700 tons, for the South American trade.

Messrs. Swan and Co. launched one screw and one sailing vessel, of a tonnage of folds his arms. And to make the matter more puzzling, in his son he has a colleague, young, energetic, aspiring, who already takes rank among the foremost mechanicians and mechanical engineers. His son is the inventor of the marvellous wood sawing, shaping, and dressing machinery in use in all the French Dockyards. Father and son applying their energies to shipbuilding and engine building, what might they not produce? But the inaction of the father in shipbuilding has precluded, or practically precluded, progress in that direction. Hence the wood sawing, shaping, and dressing machinery, and the other projects, which M. Normand, jun., has on hand, or in his head. But let us follow M. Normand, jun., into the yard. The gateway is unimposing, and so are the offices to the right and left. The entrance is at the rear of the yard, and the frontage on the Seine is before you. There is ample space for half-a-dozen ships of the largest class, but there is only one—an *Aviso*—on the stocks. And the *Aviso* has been a long time on hand. Nor is there now any evidence of haste. The *Aviso* jogs on at an old-fashioned Blackwall rate, or rather at our old-fashioned Dockyard rate. No good

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530. The screw was the *Andalusia*, 400 tons, for Spain; and the schooner the *Jeanie Marshall*, 130 tons.

Messrs. Kirkpatrick and Co. sent out the *Greyhound*, 530 tons, which is to run the blockade.

Messrs. Aitken and Co. launched one paddle steamer of 500 tons, named the *Arrow*, for the blockade running.

Messrs. Fullerton and Co. sent out *The Doon*, of 300 tons, for Australia.

Messrs. Davidson and Swan built the ———, 100 tons, for Skye; Messrs. J. M'Millan and Co., the schooner *Jura*, 100 tons; Mr. Ferguson, the schooner *Ann M'Cormick*, 100 tons; Messrs. Fyfe of Fairlie, the yacht *Fair Geraldine*, 50 tons, for Lord de Ros; and Mr. Fyfe of Rothesay, the schooner *Petri*, 50 tons. Of the following the names of the builders have not been given:—The *Ariel*, 150 tons, for the seal fishing; the *No.* 94, 850 tons, for Otago; the *Aziz*, 600 tons, for the Mediterranean, all screw steamers; and two paddle tug steamers of 100 tons each.

There were also eleven steamers which were not enumerated.

We have only to add that there are now building in the numerous yards of the Clyde 150 vessels of 137,000 tons, against 86 of 87,000 tons in 1862, and 34 of 30,000 tons in 1861.

wood ship was ever built in a hurry, nor ever can be built in a hurry. Every stick is looked at and pondered over, because as no rope is stronger than its weakest strand, so no ship is stronger than its weakest plank or timber. Three, five, or even seven years may pass before a perfect wood ship is produced; for sticks that promised well, but do not stand well, are weeded out from the structure, and in the end the structure must present an even-seasoned and even-wearing whole. M. Normand's ships have all along been distinguished for the best qualities. They have not merely been in advance as models, but they have always worn like West of England broadcloth—worn threadbare, never foundering, never breaking up easily if on the rocks, and never disappointing owners by dry rot or premature infirmities of any kind. M. Normand perfected wood shipbuilding, and in so doing earned fame deservedly, and in that circumstance is the explanation of the backwardness and idleness which he now displays. He is like a man who acquired a fortune which in old age departed from him, and who has no heart to begin the world again. M. Normand declines to adapt himself to these iron times. Nor can he think of his son striking out in the new direction. So there is only the one *Aviso* in hand at the yard at present. When that is launched and away, the Minister of Marine, or some of the rich, old-fashioned Havre shipowners, may order another sterling wood ship.

**The Sheds, Shops, &c.** The sheds and shops in M. Normand's yard are unimportant, with one exception. The exception is the premises in which the wood-converting machinery is erected, and in which also M. Normand, jun., gives play to his genius as a mechanical engineer.

The wood-converting machinery is on a much smaller scale than that furnished to the French Dockyards, and the mechanics' shop, although small, is completely stocked with engine tools. A small pair of engines are in hand for an experimental ship that M. Normand, jun., has built in the yard. These engines are the work of the young shipbuilder, and he playfully remarks that all the money he possessed, as well as all that he by hook or crook could borrow, has been spent in experiments in ships and engines. You cannot help asking him for information about his doings, and particularly to be informed of the success or failure of the present experimental ship, and he promises both; but, not having kept his word, the probability is that he never intended telling anything. Indeed, he has even failed to furnish a mechanical description of the wood-converting apparatus—an oversight, perhaps, arising from some flaw in his English patent right. Be the reason what it may, the possession of such a man, and he still a young man, is a hopeful sign at least for France. There is no saying to what perfection he may yet carry engine-building and shipbuilding, because to both he devotes his life. Science has few more devoted followers, and there are few more worthy of success. The other shops and sheds are of no importance.

The Experimental Ship. The experimental ship is for the twofold purpose of testing the strength of diagonal planking, and of testing the speed attainable when the screw or paddle are in the bottom of the ship. The diagonal planking is in two thicknesses, one inside and the other out, with all the seams caulked. What, then, is the strength of such a structure? To test this, M. Normand, jun., supported the ship on blocks at the extremities of the keel, and found the centre deflection to be very small—so small, indeed, as to prove that ships should be planked in no other manner. But the machinery was not then in the ship. The contrivance for immersing the screw or paddle under the ship is very simple. In the flat of the floor there is a box hole, within which the screw or paddle is hoisted when not in use, or when the ship is on the ground, and out of which the screw or paddle is lowered when in use. The idea is not by any means a new one, but the principle has never been fairly tried—at least as between the screw and paddle in the same ship; and it is to be hoped that M. Normand will still communicate the results at which he has arrived. Still, it is a great deal to ask, particularly when Englishmen do not care to make such trials for themselves. The utility of screws and paddles immersed in such a manner for war purposes is very obvious, because in addition to safety from shot they provide all the hold-the-water advantages of the American centre board. It is very much to be regretted that the talking members of the United Service Institution, and of the Institute of Naval Architects, do not take a hint from M. Normand, jun., and try their hands as well as tongues. Mere talk, however learned, never yet advanced science a single step.

The Honfleur Yards.

The Honfleur yards are three in number, and among the three at present there are five ships on the stocks. Those ships are all of small tonnage, but ships of large tonnage may be built. In the yards there are nothing more than the logs of timber, the saw-pits, and the mould loft. To the Honfleur yards the cheap shipowners of Havre and the adjacent ports go for ships, passing by the hearts of oak turned out by M. Normand. And if the truth must be told, they are quite right in going to Honfleur, for all experience in England proves that there is more money to be made with a cheap than a dear ship. Less capital is invested if the ship is fortunate and keeps afloat, the insurance premiums are more moderate, and, if there is a total loss, the sacrifice is less serious. And, last but not least, the cheap ship does the work quite as well as the dear one. Of course the old-fashioned shipowners will not assent to this, but the proof might be easily adduced.

M. Mazeline's Works.

Let us now return from Honfleur to Havre, and, there being no more shipyards to see, we shall visit the Havre Engine Works. The first in Havre, and, indeed, in France, are those of M. Mazeline. There the following important engines have been turned out:—

| | | |
|---|---|---|
| *Couronne* | 900-horse | power. |
| *Normandie* | 900 | " |
| *Magenta* | 1,000 | " |
| *Solferino* | 1,000 | " |
| *Flandre* | 1,000 | " |
| *Heroine* | 1,000 | " |
| *L'Aigle* | 500 | " |
| *Amazone* | 800 | " |
| *Impétueuse* | 800 | " |
| *Audacieuse* | 800 | " |

The first six were for ironclads; the seventh was for the Imperial yacht; the others were for wood ships. At present several pairs of engines for ironclads and other ships are in hand, and engine production, exclusive of all other work, is proceeding at the rate of 4,000-horse-power per annum. There are just now 900 men employed. Let the managing partner of the works be thanked here for his cordial welcome, and we shall at once pass from the counting-house to the shops.

The Shops. The shops are six in number. First, the model shop, where the wood models or patterns of everything are made. This is a remarkably fine shop; larger than any other in France or than any of the pattern shops in England. It is also well fitted with tools and workmen. Inquiry as to patterns elicits the important facts that, as in England, the engines are designed by the engineer, and that the patterns are kept by the engineers. This is a mistake, but one, in the nature of things, less serious in its probable French effects than in its English. We have an endless number of enginemakers—and the more the better, under certain regulations—while France has two or three at the most. The danger in our case, therefore, is, that in an emergency the Admiralty would forget who made the engines of a disabled ship, and valuable time would of course be lost. In France, on the other hand, the engines are either from Havre, Ciotat, or Indret, and the officers all know, as a matter of business, where their engines came from. Consequently there can be no bungle in France. What is desirable, but not completely practicable, in naval engines, is uniformity. The official engineer-in-chief should design the engines, and the parts of all engines should be convertible. That is to say, a fleet returning to port disabled should be capable of laying hold of the perfect portions of their machinery, either in store or on board less effective ships in ordinary. No doubt such a system would to some extent check improvement in engine-building, but might there not be periodical adaptations or reconstructions? For let it never be forgotten that, of all delays, those for the repair of engines are the most tedious, and a ship-of-war without effective working engines cannot really, in a time of war, be counted on. So tedious, in fact, is the mere handling of heavy marine engines, without repair of any kind, that with all the possible resources of men and means at your disposal, you could not shift a pair of 800-horse power engines from one ship to another in less time than five or six months. Hence the importance of devising some means or other of obviating any tedious repair of engines. In the British Navy the engines are as various as their makers, and what in war is to be feared is, that in all cases of serious break-down, or smash from shot or shell, the makers, as a rule, must be sent for. No extensive engine repairs will ever wisely be confided to the Dockyard engine shops, at least of this country.

The Foundry, &c.

The foundry, the blacksmiths' shop, the boiler shop, and the coppersmiths' shop are on a scale of magnitude commensurate with the model shop. Altogether a finer range of shops, both for extent and completeness, is not to be met with anywhere. As comparisons are odious sometimes, nothing of the kind will be here attempted. Suffice it to say that better shops do not exist in England, nor in the United States. M. Mazeline is anything but asleep. On the contrary, he is equally awake to the present and the future. Years ago it has been said of him, that he was the first Frenchman who would not have English workmen. In the construction of engines and boilers he saw nothing that Frenchmen were not quite equal to, and Frenchmen, under his eye, have not disappointed him. So well, indeed, has he succeeded, that he has driven the

Government shop at Indret from the field of competition, no engines having for some time past been made there. It is at Indret as at Woolwich—brains and management are wanting, and the engines either did not perform accurately or were continually breaking down. Not so the Havre engines of M. Mazeline. They perform to admiration, and are as good and enduring specimens of workmanship as the best productions of Maudslay, Penn, and others. The engines of Admiral Penaud's squadron, on the return of the ships to Cherbourg, required one operative from Havre.

The Fitting and Erecting Shop.

The fitting and erecting shop is a very fine one. Two engines, the one of 25 and the other of 30-horse power, give motion to the machinery as well as to the blowing machine which supplies the wind for the blacksmiths' hearths. Vertical planing machines, the invention of M. Mazeline, are besides driven by one-horse power donkey engines, and so are some drilling and boring machines. One of the finest tools in the shop is the great lathe, on which the largest engine cranks may be turned, and that was made in the shop at an expense of £4,000. Whitworth's and Rigby's tools abound. Here also is one of the steam launches fitting with engines of 6-horse power, and M. Mazeline has made several for the French Government. In an enclosed space screened from observation there is a new aërial machine, in which some day soon an adventurous Frenchman looks forward to crossing the Atlantic. Such are M. Mazeline's works, and they may fairly claim rank with the first in Europe. Incredulity on this point, should there be any, will be set at rest by a visit. Nor is it otherwise than it should be that a great country like France possesses engineering establishments like that of M. Mazeline. The day has gone by for France to be dependent on England for that which in reality is the greatest power in modern war at sea—namely, engines of faultless workmanship and power.

M. Nillus's Works.

The engineering works of M. Nillus are not far from those of M. Mazeline. They, as near as can be, are on half the scale of the latter. But they are nevertheless considerably in advance of those of a second-rate engineering establishment in this country. All the branches are provided for in fine roomy premises, and tools and other appliances exist in sufficient numbers to ensure the turning out of a large amount of work. Probably, if well stocked with workmen, and with plenty of work in hand, 4,000-horse power would be about the annual product; while M. Mazeline's works, if pressed, would no doubt reach 8,000-horse power. As matters stand, there are only 200 men at work instead of the 700 that there might be, and the shops have a semi-decayed, unbusiness look. A very fine pair of engines constructed by the firm for the London Exhibition are still unsold, and are the only finished pair of engines lying about. It is, however, only fair to the firm to observe that they devote considerable attention to agricultural engines and implements of various kinds, although, at the same time, it is not very creditable to their ingenuity that an English agricultural engine and English agricultural implements are the patterns worked from.

The Combined Engineering Works.

The combined engineering works of Havre are thus a great resource; equal, in fact, to an annual production of 12,000-horse power, or the equivalent of the Messrs. Maudslay and the Messrs. Penn—the two greatest English firms—when working what is called full, although not under pressure. In other words, in a time of war the engine production of Havre is equal to engines for twelve first-class ironclads; while the Cherbourg shops would suffice for the repairs of the machinery of the fleet. But it will be said they are subject to the infirmity of being required to buy both coal and iron in the United Kingdom. This is true; and, moreover, it is also true that M. Mazeline and M. Nillus, from prudential business motives, buy iron and coal from hand to mouth. Sudden war would, therefore, at the most find them with a four weeks' stock of raw material. But Havre, in the course of that month, would get all the coal and iron it required from other parts of France or from Belgium. On this point no doubt whatever need be entertained, and there is none entertained in Havre. No doubt the coal and iron would be obtained at an increased cost, but that would be the full measure of the mischief. Of course were the combined works not required for engine building they would be available for repairs, the distance from the works to the docks being inconsiderable.

Disadvantage of the Havre Engineers.

As there is no other shipbuilder in Havre but M. Normand, and the Honfleur yards are inconsiderable, the engineers are under a very obvious disadvantage in the absence of employment from the French Government. They have to send their engines to Nantes, Bordeaux, or wherever ships are wanting engines, and that they do under the additional drawback of there being few or any French merchant ships available for the work. Their ordinary course is to employ a London shipbroker for the charter of a ship which proceeds to Havre, and from thence to the port of destination. As much as £1,100 have been paid in this manner for the carrying of a pair of 700-horse power engines from Havre to Bordeaux. So it may fairly be assumed that, until shipbuilding is carried on extensively in Havre, the Havre engineers will be unable to enter into competition with English engineers. And it may also be assumed that in the absence of Government support, engineering in Havre would soon languish. As a business amalgamation is said to have been concluded between M. Mazeline and M. Armand, of Bordeaux, it is not improbable that the latter will shortly begin shipbuilding in Havre. The opening would be a good one for an English firm, but before it was embraced the disadvantages of shipbuilders in France should be fully known. In France the workmen may be drafted from the shipyards to the dockyards without even a moment's notice.

Inferior Position of Engineering Clerks.

Very oddly, in Havre the position of engineering clerks is inferior to that of the mechanic. And this is the case democratically. The man who wears a clean shirt and a black coat is less thought of than the man who wears no shirt at all, or at the best a very greasy one. But while the greasy person is thus esteemed, the genteel, hungry clerk discharges the same duties as in England. His place is in the office; he keeps books, collects money, pays the men, accompanies visitors through the works, and the like; still, he is an inferior person to the working man. And the working man knows this. He appreciates his own relative importance. The clerk, also, is not less aware of it, and is painfully alive to his degradation. Indeed, so painfully alive to his position is he, that representations were made to the writer on the subject. The inversion is a mistake—all Englishmen at least will think so. Here in England those in authority are, as a rule, suitably maintained in authority, and the system is found to answer. True, in many of our great private establishments the wages of some skilled mechanics are greater than the pay of the captain of a line-of-battle ship, and not much inferior to that of a Junior Lord of the Admiralty, but the cases are exceptional. They are not one in a thousand, probably not one in two thousand. And so well earned is all such skilled remuneration that it is as little grudged by the public as by the employers. It at least never interferes with the relation of classes; the clerk, by virtue of education, good conduct, and gentlemanly deportment, maintaining by the help of sufficient wages for all proper wants a social superiority. Most English masters err rather on the side of liberality to their clerks and stinginess to mere workmen. Their motto is something of this sort—adequate retaining fees for all posts of trust, and coercion for the others. It would be instructive to hear the Havre engineers on the other side, although it may be presumed that, as the clerks are discontented, the masters have little reason to be satisfied. But it is time to state what the Havre wages are. Clerks, including under the term book-keepers, receive from £5 to £6 a month; fitters, from £4 10s. to £7 18s.; and foremen, from £10 to £12 a month. Foremen are, therefore, twice as well paid as those in the counting-house; fitters are better paid than those in the counting-house; and, as labourers' wages are from £2 15s. 6d. to £3 6s. 7d. a month, the wages of those in the counting-house are less than twice the pay of labourers. Havre counting-house clerks are, in fact, only paid a trifle more than timekeepers, the wages of the latter being £4 a month. Were English engineers to adopt the Havre default of their clerks, English judges would pass very lenient sentences on the clerks and venture to admonish the engineers. The Havre engineers should give the policy of common-sense and generosity a trial.

**The Condition of the Havre Workmen.**

Let us now turn to the condition of the Havre workmen. That in the main is unsatisfactory, although some will suppose that they should be well off, labourers earning from 2½ to 3f., and fitters from 4 to 7f. daily. At the bottom of the evil is the credit system, the men being paid once a month. Obviously, however well monthly payments may suit the providently disposed, who happen to have few claims upon them, they must be inconvenient to the hand-to-mouth majority. They cast the great mass of workmen into the arms of the smaller, and therefore most costly, class of shopkeepers, and when the pay-day comes the shopkeepers have all the pay to receive. This is a matter of fact, not of probability or speculation. But let us hear what an intelligent Frenchman said to the writer on the subject. He said, "If the wages in France are not so high as in England, living is a little cheaper. A young man without incumbrance can have board and lodging in a public-house for about 60f. a month: £2 7s. 7d. If he gets 3f. a day—2s. 4½d.—and works during twenty-six days, he will receive in all 78f.—£3 1s. 10½d.—which leaves 18f.—14s. 5¼d.—to buy clothes, shoes, and tobacco. A man able to get 3·75f. here as fitter was paid 24s. a week in Woolwich Arsenal. Out of this he had to pay 16s. a week for board, which left him 8s. a week, the equivalent of a balance of 40f. a month. These twenty-six days at 3·75f. give him 97·50f. a month. Out of this he pays 60f. a month for board and lodging, leaving a balance rule, and afterwards to become sufferers through the of 37·50f. The difference between 40f. excess at Woolwich and 37·50f. excess at Havre is very little." Then came the case of the married men, and the Frenchman proceeded in the following terms. He said, "The married man in Havre with 3 francs a day who has one or two children, is in a condition the most miserable. There are great numbers so situated. They must live at the top of the houses, in the garrets, where they will have to pay £4 or £5 a year for two small rooms or one large one. Bread costs him 15 centimes a pound, say 6d. a quartern; potatoes .05 centimes a pound, say one halfpenny; and beef, second quality, say 7d. a pound. At this rate—and it is the lowest—he can scarcely buy some beef every Sunday to make his national *Pot au feu*, or beef soup; he is far from having the *Poule au pot* that Henry the Fourth promised all the French." The first statement is an evasion; the second only goes to show that the condition of the French operative classes at least in Havre is deplorable. Single and married, but especially the latter, are in penury. And it so happens in the married case that while the shopkeepers wait greedily for the pay-day of the customer, the landlord also has his hand extended. The room or rooms are paid in advance, monthly or quarterly in advance. How parent and child, the former leading a decent and honest life, can provide necessary clothing, in addition to necessary food, it is impossible to imagine. The French law also mercilessly, like our own, imprisons the debtor and not the creditor—although, as a rule, the one is as well deserving imprisonment as the other—and allows the landlord, when there is default in rent, to turn the unfortunates into the street, without even their scanty bedding and scanty necessaries.

The Subjection of the Operatives.

But if the condition of the Havre operatives is deplorable, what shall be said of the state of subjection or servitude to master under which they live! In Havre there are monthly payments of wages: only at the month's end are wages due, then only are wages payable to the operatives. This in itself is a hardship. But in Havre and France labour has not the free market that it has in England or the United States. Before French labour can be hired at all, the labourer must produce a book issued by the mayor or authorities of the town in which he is, and that book practically contains the story of his life. It states all about him—where he was born, his height, age, complexion, and other things essential to complete identification; where he worked first and last, his general standing as a workman, and why he left each place. Without all this there can be neither service on the one part nor hiring on the other. Even in the case of English girls going to Dunkirk or elsewhere to serve in the French factories, the same rule is followed—the English Consul in the first instance certifying that the English girls are fit and proper persons to receive a book from the authorities, in which the age and other things are entered, to be followed by a record of all subsequent engagements and changes. There is only one exception recognised, and that even is not strictly exceptional, because the rule may at pleasure be insisted on even in the case of female domestic servants. To the system, at least as regards men, the necessities of the conscription may of course be pleaded, but the excuse is insufficient, because even after the years of fitness for service in the army have been passed the book system is maintained as rigorously as ever. And what is more, there is no relaxation in the case of the maimed, the halt, and the blind.

They that seek service in France must do so in fetters. They must forego all aspirations for the amelioration of their condition by combination or other means, and commit soul and body to their employers. No doubt there are generous fellows in the class of French employers who wink at shortcomings and aberrations, or who even go so far as to help an unfortunate to the possession of a better record, but that only proves that human nature is better than the laws of France which regulate the relations of employer and employed.

Additional Degradation of French Labour.

But there is an additional degradation of French labour. All those who are exempt from the inscription maritime are liable to the conscription for the army. Havre will serve as an illustration. Every year from 250 to 500 men are drawn from the population of Havre to serve in the army under the conscription, the wants of the army on the peace footing determining the number to be drawn, and the wants are seldom less in the aggregate than 100,000 men. Single out, therefore, any man you choose—that is, any man that will make a good soldier—and if he is poor, it is a mere matter of time when he shall be drawn. It may be this year, next year, or half a dozen years hence. He is sure to be caught some time. With such a fate before a man, who that is possessed of intelligence and spirit would not rebel against it? Who would be unconscious of the degradation? Who would not be the worse, not merely as a workman but as a man, with this prospect before him? And it is a terrible prospect. Next to spending the years of one's manhood in a gaol, comes the ordeal of a barracks. The prospect of being shot is nothing, nor even that of wasting one's life in some unhealthy colony; but from the barracks one cannot come without all the better feelings blunted. French barracks, like English barracks, are French hells. The crimes that are there perpetrated and plotted are more heinous as regards the body politic than highway robbery or any other form of felony. This, at least, is the impression of intelligent Frenchmen of the working class, and it is the experience of those who have resided either in a French or English garrison town. Into the sink of a barracks the French conscript is, therefore, steeped. Nor is that all. He is conscious of gross injustice. The rich not only buy off from the conscription, nor does the Government merely rest contented with their doing so, but provision is made for the buying off, and the additional burden falls upon the poor. For example, let us suppose that the wants of the French army are this year 80,000 conscripts, then in round numbers twenty-five per cent. of that number will find the means of buying off, which would leave the army 20,000 short. To provide against this, the drafts are ordered for 100,000 to procure the 80,000, and therefore 20,000 poor Frenchmen are drafted beyond the equitable number. The Imperial Treasury takes the money; does not, be it observed, pay it away for substitutes, but lays hold of an additional 20,000 of the poor. The injustice is keenly felt. It drives thoughtful men mad, or, at least, it makes them reckless. They feel themselves little better off than Carolina negroes.

The *Modus Operandi* of the Conscription.

The *modus operandi* of the conscription is not generally understood in England. Take Havre for the illustration, and put the matter in the clearest form. Two hundred and fifty or five hundred conscripts are to be drawn—it does not matter which. Let us assume that there are 5,000 or 10,000 eligible—it does not matter which. The eligible names as regards age are put into a box or bag, and the 250 doomed names are the names first drawn. They are the names of the conscripts for the year. But some of the number are entitled to exemption, so the drawing must proceed until the required number are obtained. Still, while the liberty of the subject, such as it is, is asserted by all legal claims for exemption being put in, the rights of the Government are at the same time vindicated by requiring the right sort of conscript. Who is this fellow Brown, that fellow Jones, and that fellow Robinson, with whom the State is to be burdened? Brown is a shade below the size; we reject him. Jones is narrow in the chest and weak on the legs; we reject him. In Robinson there is an hereditary taint which disqualifies him. The drawing is accordingly resumed. It, in fact, proceeds until unexceptionable conscripts are each year obtained—until the best to be got are had. And although Brown, Jones, and Robinson are rejected this year, they may be accepted next year or the year after, just as it happens that it is thought that they will or will not do in the judgment of those who are called on to decide. The practical effect of the conscription, of course, is to discourage every form of industry by seizing the best men; for it really happens that the best workmen are also best suited for the army. The French army may, therefore, without exaggeration, be said to be the curse of France; and there is obviously much more nonsense in supposing that it is a curse in the case of desiring fighting for honour and glory and stuff of that sort than is generally supposed. It is a curse in the sense of interfering with the pursuits and liberties of all Frenchmen. Why it drills so well and fights so well when it does fight is because it is composed of the picked men of

France; and, in truth, the picked men of any country would fight or drill quite as well. The French Government find it a convenient bugbear—that, namely, of representing the Emperor as holding the army in check with great difficulty, because it gives credit for moderation, when in reality a policy of downright aggression may be in contemplation or in course of being carried out. But for the conscription France would possess a much more moderate army in point of numbers than the British Government. Still, it will be said, unwilling conscripts may in time become ambitious soldiers. No doubt they may, but it is just as likely that they may not.

The Port of Havre.

Let us now turn to the port of Havre. It is adapted to commerce on the greatest scale, and during the last year or two of the old American cotton trade it began to attract considerable attention in Europe and America. Since then the port has rather languished; indeed, it really has done so; and the labouring population attracted by the relatively higher wages current have been severe sufferers. And a rather numerous class of young merchants counting on progressive expansion have found themselves mistaken. Still the commerce of the port at the highest point was not great, as compared with Liverpool or the Clyde, the import of cotton being little more than half a million bales, and the aggregate tonnage entrances, including repeated voyages and coasting voyages, not exceeding 1,200,000 tons. What, perhaps, more than anything gave prominence to the port was the advantage presented by it of a competing Continental market, to which cotton cargoes could at any time be ordered if there was money to be made by so doing. But for the American war it is possible that owing to this advantage the cotton imports of the port would have attained great proportions, first, by reason of the natural capabilities, and second, by the admirable basins and storehouses which have been provided. Disappointment at present is borne with a good grace, and sympathy for the Confederates is expressed warmly. From the North the port expects nothing, while from the South it looks forward to renewed intercourse, with all the benefits that follow in its train. To the port there are the two serious drawbacks, that the roadstead is exposed to the north and south, and that the ground is not favourable for holding the anchors of ships of any weight. The only remedy practicable is in course of being supplied—namely, the extension of the basin accommodation in the harbour.

The Basins and Dock.

The basins are seven in number, the collective capacity of which is 600 ships of all classes. *L'Eure*, the largest, has a superficial area of 750,000 square feet. The eighth, and largest of all, for years in contemplation, is at length determined on, and will cover the whole present site of the citadel. It is, however, not improbable that a second dock will be thought of in connection with the works, of the same capacity as the one recently completed. That recently completed dock is 600 feet in length and 120 feet in breadth, both measurements at the top. For the carrying on of these works the Imperial Treasury supply all the facilities that may be required. Indeed, the Minister of Marine takes the initiative in all such works, for he regards them in rather more than a semi-official light. The municipalities are of course never backward, nor yet are capitalists, as there is an understood minimum of 7 per cent. interest from the time of subscription for ever, or until the next revolution, beyond which some Frenchmen pretend not to see their way in financial matters. And they are quite right. It is with railways as with harbours, the former being also guaranteed; and the guarantees being the great difficulty in the way of the Republicans, it is possible that they will provoke repudiation. By the aid of the guarantees the Emperor, at least for the present, has succeeded in binding over the small and large moneyed classes to keep the peace. That the peace may be long maintained is, of course, the wish of most Englishmen, for as we appear to have no political interests in Poland or Denmark, we can have none in France.

# CHAPTER IX.

# NANTES.

M. Gouin's Yard.*

M. Gouin's yard is readily accessible by the ferry-boat crossing from one of the leading thoroughfares, and is not readily accessible if searched

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* The north-eastern ports are a good offset to Nantes. The *Times* recently published the following statement:—

*Iron Shipbuilding in the North-Eastern Ports.*

As might have been anticipated, the published returns of the state of iron shipbuilding in the north-eastern ports show a marked and extraordinary advance in 1863 upon the previous year. The following is the amount of tonnage of iron ships launched during the year 1863 as compared with 1862:—

| | 1863. | 1862. |
|---|---|---|
| On the Tyne | 51,236 | 32,175 |
| On the Wear | 25,000 | 15,608 |
| On the Tees | 15,060 | 9,660 |
| Total | 91,296 | 57,443 |

| Estimated value of the above:— | 1863. | 1862. |
|---|---|---|
| On the Tyne | £922,248 | £546,975 |
| On the Wear | 450,000 | 265,336 |
| On the Tees | 271,080 | 164,229 |
| Total | £1,643,328 | £976,540 |

Quantity of iron consumed in the construction of iron ships during the years 1863 and 1862:—

| | 1863.<br>Tons. | 1862.<br>Tons. |
|---|---|---|
| On the Tyne | 32,170 | 22,540 |
| On the Wear | 15,697 | 9,360 |
| On the Tees | 10,539 | 6,760 |
| Total | 58,406 | 38,660 |

These figures show an aggregate tonnage of 97,066 tons, making a total value of £1,643,328, exclusive of the engines; and a total of 58,406 tons of iron consumed last year in iron shipbuilding on the three northern rivers.

for by crossing the bridge at the upper part of the town. The writer had the misfortune to cross the bridge. By doing so, however, the worst side of the pleasant thriving town is seen, and that is not unlike the Isle of Dogs. There are detached houses, detached streets, no footpaths, plenty of mud in wet weather, and no end of noisy unwashed children at all times. Nevertheless the suburb is a thriving one, and of the utmost consequence to Nantes. As the longest lanes have a turning, so the yard of M. Gouin was reached at last by the writer. The senior partner of the firm was absent, and there being no objection to the premises being entered in his absence, the entry was made without more ado. It was, however, kindly stated on behalf of the senior partner, that he would be happy to receive the writer next morning. The yard is a disappointment. It is what one would meet with in an English county-town. But one of the latest ships turned out by the firm was the Italian ironclad frigate *Castelfidaro*, a frigate with an ascertained average speed of sixteen knots, or twenty statute miles, an hour. There, in the water in front of the yard is one ironclad battery, and on the stocks, almost ready for launching, are two more ironclad batteries and one Transatlantic steamer. These are formidable products from such a place—indeed, they are impossible products according to our official, if not to our general, way of thinking. But there they are; and more marvellous still, M. Gouin only gave his attention to iron shipbuilding the other day. He was a wood shipbuilder as long as there were wood ships to build, and would still build wood ships as before if they were wanted for the merchant service or the navy. And very oddly, as it will appear to many, he could pass from wood to iron, and might pass back from iron to wood, without "reconstruction," suspension of work, outlay, or inconvenience. There is an extensive building frontage, and a strong body of navvies are at work on its enlargement.

The Shops, Sheds, &c. The shops and sheds are of easy enumeration. There is an ordinary tool shop, chiefly for small iron work; a forge, with a considerable number of smiths' hearths, and a good timber saw shed. Beyond these there is nothing. These, with the fine building frontage and the ships, constitute the famous Nantes shipbuilding establishment of M. Ernest Gouin and Co. In the arrangement of the premises there is neither ingenuity nor taste. The yard is a mere river-side strip of ground, and it is beside the gateway that the shops are placed, because there they were found to be most convenient when the yard was started, and are not now so inconvenient as to warrant change. So at least the firm think.

The Ironclad Batteries. As the writer did not see the *Castelfidaro*, but went over the three batteries, the *Arrogante*, *Implacable*, and *Opiniâtre*, for the Imperial Navy, it will be well only to speak of them. Measured roughly on the gun deck with the legs, the length is thirty-eight yards and the breadth fifteen yards. Standing on the gun deck you are in a box, the forward and after ends of which have five guns in each, while the sides have nine guns in each. Each battery, therefore, mounts twenty-eight guns. The between-decks, judging by one's hat, have not less than seven feet height, and the beams overhead are iron, with an iron deck, above which there is the usual wood spar or weather deck. The frame from the gun deck to the spar deck is iron, with an iron skin; and there are teak fillings in the cheeks of the ports and along the merlon between the ports. Leading from the gun deck to the spar deck there is the awkward staircase of the pilot-house, as well as other passages for ventilation and the convenience of the crew. From the pilot-house all the guns will be directed by the officer of the deck, as is the practice in the frigates. Descending now from the battery in the river to the floating punt alongside, the workmen are busy adjusting the 4½-inch armour-plates on the bow and sides, it being the intention to carry plates round and round, and well below the water-line. At this point your attention is directed to the athwart ship batteries fore and aft. These batteries are well inboard so as to be waterborne, an arrangement which obviously improves the stability and seaworthiness of the ship. Between the athwart ship batteries and the extremities there is an open space enclosed by folding bulwarks, to be dropped when these batteries are in use. The idea is not a new one, but it nevertheless is admirable in practice. Leaving now the battery in the river, let us turn to those in the yard. Going under one the bottom is perfectly flat, and at the stern there is the abrupt rise of the open river barge. In fact, the batteries in form, below water, are common sailing barges with the bottom and stern of the open river barge, but with the bow of the sailing barge. Then when you step back and look, the upper works have been raised in the same manner as were the upper works of Mr. E. J. Reed's *Enterprise*. In a word, fighting boxes, as Admiral Halstead would say, have been erected on barges. The entire structure, however, with the exception of the two thicknesses of teak backing behind the armour, the port cheeks, the merlon fillings, and the decks, are iron. And a substantial job the ironwork is. The work will really compare favourably with the best iron ship work in England, and probably for this reason, that Frenchmen have very modest ideas of their own ability to build iron ships, and consequently do the best they can. One other point remains: the batteries are to be provided with double screws. These screws, it is found, fit well in open barge sterns, and it is also found that barge batteries are an immense step in advance of the batteries built during the Russian war. The Russian war batteries made their way to the Baltic and the Black Sea with great difficulty: there is reason to believe that the barge batteries may be trusted anywhere. Indeed, in them the ship and battery are combined, and in all computations of relative ironclad force it would be a mistake to exclude the Nantes batteries from a place beside the frigates.

The Forges de la Basse Indre.

The Forges de la Basse Indre are on the way between the ferry-boat landing and M. Gouin's yard. The firm were exceedingly polite to the writer, and fully satisfied his curiosity as to the quality of armour-plate bolts. They are most extensive manufacturers of the bolts, and the bolts were therefore seen in the various manufacturing stages, as well as in the finished state when the quality might be tried. In the first place, there is a careful hand-picked selection of the iron, all of which is unexceptionable charcoal iron. In the second place, the welding and the giving of the screw-thread are effected at temperatures and in manners determined by long and anxious experimental investigation. What the Minister of Marine required was perfect bolts; bolts that would not break; bolts that would hold to the last—that would hold as long as there was anything to hold. Such bolts it is believed are manufactured at the Forges de la Basse Indre. And there is an appropriateness in applying to such a place for bolts, the Forges de la Basse Indre being one of the great French chain and anchor works. The bolts wanted by the Minister of Marine were to bear the greatest possible tensile strain; and as chains, and in a less degree anchors, are supposed to bear the greatest tensile strain, the manufacture was entirely in the way of the Forges de la Basse Indre. Had we wanted such bolts as those securing the French armour-plates, the Admiralty would of course have applied to the chain and anchor makers, and to no others. Put the French armour-plate bolts into a hydraulic machine, and you will break them as you will break anything with a superior force if not by an inferior; but you may almost fire at a French target till doomsday without entirely stripping it of its armour. The bolts will twist and twine every way, and into all shapes, but shot will not break them. The fibre of the iron is the finest that the writer has ever seen, and he has seen the Sheffield specimens of Mr. John Brown and Co., which are very fine.

The Works.

The works of the Forges de la Basse Indre are as remarkable for the same thing as the works of M. Gouin. They are absolutely insignificant in comparison with the great works of the same character in this country. The entire works would barely constitute a single department in the works of a great English firm; and even then the English department would stow the whole machinery and tools of the Forges de la Basse Indre in one corner. One large roomy shed may be said to constitute the works of the Forges de la Basse Indre, the departments being under the same roof. Up the centre there are the blacksmiths' hearths, on the right there are the larger tools, and on the left the smaller tools. Then, in a detached building there is a foundry, and in some small buildings petty shops and stores. Armour-plate bolt making, chain making, anchor making, and general ship ironwork proceed promiscuously, and should an order be received for angle iron or heavy forgings, it is attended to. Coal is supplied direct from Wales at a price equal to £1 a ton, or from the French coalfields at an average price of about 17s. 6d. a ton.

The Nantes Economy.

The Nantes economy, as exemplified in the establishments of the Forges de la Basse Indre and M. Gouin, is of considerable practical importance, and may fairly claim consideration in this place. In the one we have an establishment meeting the wants of trade in ordinary and extraordinary iron manufactures, concurrently with providing armour-plate bolts in large quantities for the ironclad ships and batteries built in the dockyards and shipyards of France. In the other case we have an establishment building a peaceful packet steamer concurrently with the construction of one ironclad frigate and three ironclad batteries mounting 28 guns each. The work committed to both fairly entitles each to the character of being great. Individually they are great works, turning out products of the greatest magnitude and importance. Still, a very few thousand pounds would buy either or both establishments. The annual rental of both on the Thames, with plant, would probably be excessive at £500. This is a striking fact, for it is completely at variance with opinion on such subjects in this country. We are for colossal shipyards and colossal forges, conducted by limited liability companies on a broad and influential basis, it being inconceivable that modest establishments in such lines are of any use. Nantes combats our theory. It does in a small way what we are striving to do in a large way. Nantes takes the ground that all that can be dispensed with should be dispensed with; we take the ground that you should lay out on your place all the means that you have and a large part as well of all the means that you can borrow. We are for effect; they for utility, security, and profit. Let us attempt to judge fairly between the two systems.

The Utility of Establishments.

On the question of the utility of establishments considerable light is thrown by some of the modern innovations in business. An extreme case would be that of operators on 'Change, who may have no office of their own, but mere desk-room in that of a more profuse neighbour. The facilities for the buying and selling of securities are such that the word-of-mouth part which may take place on the train or omnibus to town, in the street, at the luncheon-table, or anywhere, is the most serious part. Establishments are superfluous for at least one class of Stock Exchange operators, although the individual transactions of some of them may exceed in amount those of M. Gouin and the Forges de la Basse Indre. Take another class, the London wholesale merchant. Many of these in Eastcheap and elsewhere are occupants of a single room or of two rooms, in which there are some samples and a few old chairs and desks. Yet among those small occupiers may be found some of the best respected and some of the most well-to-do merchants in the City. The conveniences of the Custom House, the docks, or the sugar refiners have rendered establishments unnecessary. The small occupiers make use of the benefits the times afford them, and as a rule they never see any portion of the bulk of what they buy and sell. It comes into their possession and goes out of it in a fictitious but strictly legal kind of way. Then there is the shipbroker, a personage not yet of very mature years: he never thinks of learning more of the ships he charters than the single line of information furnished in Lloyd's list. Thus experience proves that establishments may now-a-days be of very questionable utility. They are really things, in certain cases, which it behoves us to consider whether they might not be got rid of altogether. In the case of shipbuilding, there are various points to be kept in view. How, for example, about timber or iron, or both? Shall the supply be from hand to mouth, or will great stocks be accumulated? How about shops, sheds, tools, &c.? Shall the former receive extensions and the latter additions? In other words, shall the shipbuilder separate himself or identify himself with what surrounds him? He may be a timber merchant in addition to being a shipbuilder, or he may content himself with being a shipbuilder and buy the timber that he needs when he needs it. He may be an iron merchant in addition to being a shipbuilder, or he may content himself with being a shipbuilder and buy the iron that he needs when he needs it. As to shops, sheds, and tools, shall he act as if he were a Robinson Crusoe, or will he take a hint from the shipbroker, the wholesale merchant, and the Stock Exchange operator? M. Gouin and the Forges de la Basse Indre act on the principle of the shrewd business Londoners, and like them they prosper. It is to be feared that there are few M. Gouins and few Forges de la Basse Indre in this country. But there are some, two of the most notable instances of which that occur to the writer's mind are the establishments of Messrs. Samuda Brothers, Poplar, and of Messrs. Laird Brothers, Birkenhead. In those two well-known and eminently prosperous English shipyards there is very little sunk capital. The markets of the country are depended on as much as possible. On all occasions the ironmaster is resorted to for particular makes and shapes of iron; and as for wood, not a stick is bought but for some special purpose. The tools and machinery in these yards may be safely designated as tools of necessity. And the Messrs. Samuda and Messrs. Laird are right. It is as much a delusion to suppose that a shipbuilder can best provide himself as a manufacturer with everything, as to imagine that private individuals would find it to their advantage to make their own boots and clothes. Let us suppose that there are heavy forgings wanted. At the first blush the production of these forgings on the spot would be attended with a series of advantages. The Mersey Iron Works, or the Millwall Iron Works, would in such a case not require to be paid. In the second place, you have your forgings when you want them, and how you want them. In the third place, old stuff lying about would be worked up. And last of all, a great steam-hammer would be an outset to the yard, and probably lead to orders. But a steam-hammer once bought is bought. It is an investment—money sunk—cash taken from the bank account. Perhaps in six months of the twelve it will be unemployed, and if so, the constantly going hammers of the Millwall Iron Works and of the Mersey Iron Works—particularly in dull times—will turn out cheaper forgings. Then a moment's reflection is only required to show that the presence or absence of a steam-hammer from a shipyard will not influence the judgment of any man of common sense who wants a ship built to order. As to the scrap iron, it will always find a buyer. The forgings with which you encumber yourself would in all likelihood be quicker and better done by others. And as regards the non-payment to the Mersey Iron Works or the Millwall Iron Works, all that would have in the long run to be paid to them would have been anticipated in weekly wages to the men employed at the hammer. Thus the production of forgings in a shipyard is a mistake: so also, for practically the same reasons, is the production of anything that can be bought readily, and at a fair market price. For the prevalence of error on this subject, the Admiralty, and the upholders of Dockyards with all their abuses, are in the main to blame. From time immemorial it was conveniently pretended that unless timber were stored in enormous quantities in the Dockyards, it would be impossible to find the right kind of stuff for building ships for the Navy. Consequently timber was accumulated, and because timber was accumulated, other things came to be accumulated. But, unhappily for the timber-storing theory, the other day, with all the Dockyards inconveniently crowded with more timber than is ever likely to be used, it was found impossible to obtain sufficient of the right kind to complete the stern of one of Mr. E. J. Reed's small ships at Chatham. The truth is that timber always abounded and will always abound in the markets of this country, and the greater the demand the greater will the efforts of importers be to provide a supply; and if from the first the Admiralty had bought timber as it was wanted, no greater difficulty would have arisen than is experienced in supplying canvas or rum. To this day, however, the

Admiralty are obdurate, and so, no doubt, are all the private shipyards whose interests have been compromised by the acquisition of mere dead weight. The day, probably, is not distant when sounder teachings will prevail both in the dockyards and shipyards of this country, and when establishments will be regarded with regret rather than with pleasure.

The Security of Establishments.

On the question of the security of establishments a great deal might be said, and apparently with considerable profit to those immediately concerned. But it is desirable to be brief. Taking a somewhat farfetched view of the subject, it might be said that were war to arise, M. Gouin and the Forges de la Basse Indre would be comparatively small losers; and conversely, that were a squadron to force the passage of the Thames or Mersey, the English shipbuilders would suffer greatly;—shipyards, it is to be presumed, being always doomed to burning. But there is no occasion to be farfetched. Shipping, and all connected with it, are proverbially subject to extreme fluctuation. The prosperity of one year or series of years is followed by the depression of others. The time invariably comes round when it would appear that all that had been made before is dissipated. Often has it happened that while there was one cargo to be carried there were six or even a dozen ships competing for it. And when there are such times, those only possessing knowledge of shipping matters are aware of the sacrifices entailed on owners, masters, and seamen. Then, necessarily, an overgrown—that is, an absurdly overgrown shipbuilding establishment reveals itself. Such an establishment is inelastic; there is no holding back from untimely outlays; no devising of more economic means of meeting the cutting competition that has set in upon you, because you have blindly taken your stand in deep water. Recurring to the previous example, your heavy steam-hammer for heavy forging is not only useless, but, what is far worse, it is inconvertible in a pressure. It is money sunk; money spilt upon the ground, which cannot be gathered up again. So with other superfluous things, the acquisition of which was ignorantly and madly thought of in a prosperous hour. Represented in hard cash at the bankers, or in good bills in the safe, those superfluous things would probably enable the prudent shipbuilder to weather the stagnant term. He would at least be in comparatively affluent circumstances. In a word, inelastic shipbuilding establishments are doomed establishments in trying times, when elastic establishments such as those of M. Gouin and the Forges de la Basse Indre would hold up their heads and pay their way. As to the security of Dockyard establishments little remains to be said. They should be on as small a scale as possible in England, although those of France should perhaps be on the largest scale possible. Small English Dockyard establishments imply dependence on the private industry of the nation, and very little to be burned. Great French Dockyard establishments imply, on the other hand, the creation of those resources which the private industry of France does not supply. To create those resources France is compelled to fortify as no other nation has or ever will fortify: an expenditure from which we may fairly claim to be delivered.

The Profit of Establishments.

There is one point more to be considered—the profit of establishments. M. Gouin and the Forges de la Basse Indre, inasmuch as they have compact unencumbered establishments, conduct their business in a clear and most exact manner. They have invested as little as possible in plant, and those engaged on the plant are easily and effectually supervised. Some one's eye is always on the workmen, and they show daily by results something for the money paid to them. So far everything is right; there is a small workshop staff, who are seen to. Then material enters at the gate, not wholesale, but in a retail kind of way. Let us say, in the case of M. Gouin's yard, that five tons of angle iron and five tons of plates are received to-day. These are taken in hand and are worked up; but before they are quite worked up, more of each or both are ordered. What an admirable check the ledger furnishes on the transactions of an establishment conducted in such a manner! There are the incomings of material, week by week, or day by day; there are the outgoings of wages; and last of all, the figures in the margin of the ledger are the contract price for the job. Surely a business so conducted, supervising and controlling the work at every step, will yield a greater profit to the proprietors when prices rule high, than a business the normal state of which is muddle or semi-muddle, and when prices rule low it is likely to push the other to the wall. And there is no denying it, that as a rule in shipbuilding the smaller the establishment the better for all concerned. Good workmen in a shipbuilding establishment of moderate proportions are likely to be found out as well as bad ones, while in an overgrown establishment both may pass unnoticed. Then as regards the builder and shipowner, or as regards either, it is the case, from the nature of shipbuilding, that it is only in moderately sized shipyards that full and constant work is procured, if the men are on day wages; and that really good work is obtained, if the men are contractors or employed on task and job. Shipbuilding, like engine-building, is slow, and in some measure it is unseen; the great test of workmanship being rough weather on the ocean. No wonder, then, that great reputations have been earned in shipbuilding, for the smallest shipyard may turn out the cheapest and the staunchest ship; and no wonder that from the gigantic firms nothing superlatively cheap and at the same time good has yet emanated. A cheap and good ship from a great shipyard might be produced in the same way that dividends are for a bad railway. Although this is well known among shipbuilders, but not very frequently acknowledged, the distinction between great and small shipbuilding establishments as regards profit has not before been pointed out. And, very naturally, the public have supposed that it is with ships as it is with spinning or weaving hemp or cotton—that the greater the production the smaller the producing cost. The contrary holds in shipbuilding: the smaller the production the better is the work and the larger is the profit. And true as this is in England, it is obvious in France, for in the cheap French shipyards the ships built under good management must be so at an advantage to the shipbuilder, which is considerable.

The Absurdity of Effect. Of the absurdity of mere effect in business matters it is not necessary to say much. But if our shipyards as a whole have any marked feature, it is the one of straining for mere show. Let our shipbuilders, those as yet uncommitted to extravagances in machinery and tools, visit the French shipyards before they commit themselves. There they will witness many things accomplished in a satisfactory manner by very humble means. And, not to give the French shipbuilders undue praise, let it be said that modesty has been forced on them. Capital is less abundant in France than England, and French bankers therefore are less accommodating than English bankers. Besides, in France neither shipyards nor ships are or ever were in great favour with the masses. So there is but a small fund at the disposal of the French shipbuilder. What he does he must accomplish with little means, and that he should succeed so well is, in addition to being creditable to him, a hint to us, of which the prudent will take advantage.

The Port of Nantes. The port of Nantes is of considerable commercial importance, but the bad navigation of the Loire has led to the establishment of an outport of St. Nazaire. This, however, is scarcely to be regarded as a disadvantage, because, as regards heavy freight to and from St. Nazaire, the cheap carrying of the river is available. To be sure there are double landing and loading charges, first, from the ocean vessel to the river craft, and afterwards from the river craft to the quays of Nantes, but there is the offset of exemption from dock dues in St. Nazaire. As the writer did not visit St. Nazaire, he cannot speak of the outport from personal observation. Of St. Nazaire Frenchmen say that it is to the Loire what Havre is to the Seine—a fine steam harbour, admitting vessels at all states of the tide, and provided with two docks sufficient to take in vessels of the largest class. The chief basin has a superficial area of 106,000 metres, and the principal dock is 600 feet in length. At St. Nazaire Messrs. Scott and Co. of Greenock are building, in a yard created for the purpose, five steamers for the Transatlantic Company, of the following dimensions:—Length on deck 106 metres 50 centimetres, breadth 13 metres 40 centimetres, depth 19 metres 60 centimetres. The engines are of 850-horse power, nominal; the tonnage, old measurement, 3,300; and there is accommodation for 300 passengers. St. Nazaire admits of very strong defence, and during war would be of great service to the Navy. No doubt it was with this view that the Imperial Government assisted the Nantes people. Within ten miles of Nantes, also on the Loire, is the once famous steam factory of Indret. This factory the writer did not visit, so that again he does not speak from personal observation. Indret was established by the French Government to supply engines to the French Navy; but, unfortunately for the reputation of the factory, the French mechanics served their apprenticeship to engine-making there. The consequence was that Indret got a bad name for engines, because the engines uniformly broke down. But what was the French Government to do? To buy engines in England would not answer always, and Indret failing, it did not follow that Frenchmen could not make engines. Mazeline, of Havre, and the private works at Ciotat were therefore appealed to, and Mazeline and Ciotat of course succeeded, as private enterprise will always do. Since the success of Mazeline and Ciotat, the French Government have had little or no occasion to contract for engines in England or elsewhere, and there have been none made at Indret. Indret is now a general workshop, available with its fine tools for any work that the French Government have in hand, and in that general capacity is of great value to the French Government, but chiefly because there are in the district no great private establishments to contract for work.

## Chapter X.

## BORDEAUX.

**M. Armand's Yard.***

M. Armand's yard is the only one in Bordeaux, as M. Gouin's is the only one in Nantes, and M. Normand's the only one in Havre. It is a remarkable yard that of M. Armand's, and one to which strangers have not ready access. As the writer was expected in Bordeaux for the purpose of visiting the yard, on seeking admission it was only necessary to wait the arrival of M. Armand. The privilege was

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* The Thames is a good offset to Bordeaux. The annual production of the Thames shipbuilders may be roughly stated as follows:—

| | | |
|---|---|---|
| Thames Iron Works ... ... ... ... | 25,000 | tons. |
| Millwall Iron Works ... ... ... ... | 20,000 | " |
| Charles Lungley ... ... ... ... | 15,000 | " |
| Samuda Brothers ... ... ... ... | 12,000 | " |
| James Ash and Co. ... ... ... ... | 10,000 | " |
| Dudgeon and Co. ... ... ... ... | 9,000 | " |
| Rennie and Co. ... ... ... ... | 6,000 | " |
| Wigram and Co. ... ... ... ... | 4,000 | " |
| Green and Co. ... ... ... ... | 4,000 | " |
| Minor firms ... ... ... ... | 12,000 | " |
| | 117,000 | tons. |

The Thames Iron Works are iron manufacturers on a large scale, and recently the capital of the company has been greatly augmented so as to admit of engine building and repairing, and the excavating of dry docks. Under the practical management of Captain John Ford, and the judicious supervision of Mr. Peter Rolt, a highly respected London merchant, the affairs of the company are in an exceedingly prosperous condition. The company were the builders of the *Warrior* and the *Minotaur*, and the finishers of the *Valiant.*

frankly accorded. "Go where you will, and examine what you will," were the words of the worthy member of the Legislative Assembly. The remarkable feature of M. Armand's yard is that it is on the bank of the Garonne, between two bridges: it is as it were in the Temple Gardens, the finished ironclads passing through the arches of a bridge not unlike those of the old Blackfriars-bridge which are taking down. To accomplish this the ships are sunk sufficiently to admit of passing through an arch, and at the other side of the bridge the water is pumped out. The doing of this has become a matter of course in Bordeaux, just as telegraph wires along the railways and over leading thoroughfares are as commonplace as clothes-lines. There are twelve covered building slips in the yard, the appearance of which on the river-side between the bridges, in the outskirts of the fine city, is very pleasing.

The Ships in the Yard.
The *Sphynx.*

The ships in the yard, in the order in which they are presented to the visitor, are a fine Transatlantic steamship, an ironclad cupola corvette, two iron-armoured batteries, two merchant sailingships, two additional iron-armoured batteries,

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The Millwall Iron Works are iron manufacturers also, and probably are the most successful manufacturers of armour-plates and armour-plate bolts in England. The iron manufacturing department of the works is under the direction of Mr. Hughes, a gentleman of reputation in the iron trade. The Admiralty and War-office intrust the company with the manufacture of the greater number of the experimental targets, and are constant contractors for armour-plates. The company have at present in hand the *Northumberland*, a ship of the same class as the *Minotaur* and *Agincourt.* The works are under the direction of Mr. George Harrison, an engineer of great experience, assisted by a most efficient staff.

Of the others it is unnecessary to say more than that Mr. Charles Lungley is the inventor of the unsinkable trunkways which recently have been adopted by the Admiralty, and that the firm of Messrs. James Ash and Co. are the builders of the extreme speed blockade-runners. Mr. Ash was for some years the naval architect of the Thames Iron Works, and of Mr. Mare, who preceded the Thames Iron Works in Orchard-street, Blackwall. The engines of the extreme speed blockade-runners have all been built at the Blackwall Iron Works of Mr. John Stewart.

and two additional merchant sailing ships. The display is very creditable—indeed, the most creditable in France. It is a class and amount of tonnage that at any period would not discredit the Millwall Iron Works or the Thames Iron Works, and those are the greatest private shipbuilding establishments that we have. Of neither the Transatlantic steamer nor the merchant ships is it necessary to speak. Let us therefore at once approach the *Sphynx* ironclad cupola ship. This is the first cupola ship built in a private French Dockyard, and the first wood cupola ship that has been built or proposed to be built anywhere. Were the voice of rumour to be trusted outside M. Armand's yard, the *Sphynx* is for the Confederates, and wood has been chosen so as to provide a clean copper-bottomed cruiser for the warmer latitudes. That is to say, the wood bottom of the ship is to be coppered. The ship is very formidable, chiefly from the admirable disposal of the weights. Instead of four cupolas, as in the *Prince Albert*, there is only one in the *Sphynx*, and that one is in the centre of the ship. The engines and boilers being also in the centre, all the heavy weights on board the ship are there—an arrangement which obviously leaves the extremities or ends buoyant, and admits of quick turning and manœuvring. Then, to compensate for the weight of the shaft and screw aft, and make good the tumbling-home deficiency of the ram bow, there is a forward armour-clad deck bulkhead, pierced for one gun. This may, at the first blush, appear excessively refined as regards adjustment of weight, but it is nothing of the kind. The truth is, that all fighting ships should, as ships, be in a state of equilibrium before coal and other stores are put on board—trusting nothing to hasty trim expedients—and coal and other stores, when put on board, should be so disposed that consumption and use would never prove embarrassing in the presence of an enemy. Such at least is contemplated in the *Sphynx.* The ship is always to be in good fighting trim; never to offer an advantage to a more powerful enemy in chase, after the burning of a few hundred tons of coal. The same is not to be said of the *Prince Albert.* The Admiralty designer of that ship—whoever he may be—should be declared incompetent to serve her Majesty, and dismissed the service. Instead of one cupola like the *Sphynx,* the *Prince Albert* has four; and while the engines and boilers occupy the centre, there are two cupolas hanging to the fore and aft extremities.* So monstrous a distribution of weights will not only render it next to impossible to steer the ship, but the ship will be in constant danger of its back breaking. Indeed, a wood ship so constructed would be perfectly unseaworthy. Should the *Prince Albert* hold long together, valuable proof will have been furnished of the greater fitness of iron than wood for shipbuilding; but, of course, should the ship be consigned to the third class division of the steam reserve in the Medway, the strength of back will not be severely tested. The bottom weakness of the *Royal Sovereign,* and the *Prince Consort* is of a different kind from the general weakness of the *Prince Albert,* because the former are ships required, by the sheer mismanagement of the Admiralty, to carry armour-plates instead of wood plank. Ships so unexpectedly burdened and strained must necessarily, if they do not give way in dock, like the *Royal Sovereign*, open like a basket in the trough of the sea, as in the case of the *Prince Consort.* But returning to the *Sphynx.* On the main deck there will be the pilot-house of the French ironclads, from the interior of which the ship is steered, and the guns of the ship laid at the elevations and deflections thought necessary each round by the officer of the deck. Descending from the deck of the *Sphynx*, and standing at the bow, one is struck by its close resemblance to the bow of the Russian battery *Pervenets*, launched by the Thames Iron Works last year. On the nose of the bow of the *Sphynx*, however, there is an iron spear, strong enough to tear up anything with which it may ever come in contact. Let us next pass to the bottom of the ship, the peculiarity of which is great length and breadth of floor, with full sides, giving great hydrostatic stability, and yet with fine entrance forward and clearance aft. You unhesitatingly pronounce the *Sphynx* a great ship, one that will do its work well, whether under the Confederate or French flag. But what are those strange things along the bottom? They are for applying the twin screws to wood ships. On the bottom of the *Sphynx* there is the ordinary keel of a wood ship, and from about two-thirds the length forward there are two other tapering keels carried aft to where the twin screws are attached. The contrivance is more clumsy than with iron, but is equally efficacious. Within the inclosure formed by the two extra keels, the keels being built full up under the counter, there is, or rather will be, a remarkable collection of slack water. The armour-plates are well below the water line, and carried right up to the deck all round the ship.

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* The Prussian cupola ship building at Poplar is to some extent a smaller copy of the *Prince Albert,* with this difference, that the two cupolas at the extremities are dispensed with. For the omission the Prussian Admiralty deserve great praise, because they will possess a better cupola ship than the *Prince Albert.* A single cupola would, however, have been still better, armed with two ten-inch guns. Although the Prussian cupola is not likely to be employed against Denmark during the present war, it may not be uninteresting to the Danes to learn that the Prussian ship is not so good as she might have been, and is likely to steer badly.

The Batteries.

The batteries are the latest laid down on account of the French Navy, two not being fully in frame at the time of the writer's visit, while two were plated. They are all of the same pattern, and that is as near as can be oval. Measuring roughly by the legs, the breadth is 60 feet and the length 120 feet. The depth is considerable, probably as much as 20 feet—which is great—on perfectly flat bottoms, the object being to keep the port sills well out of the water, should the batteries ever require to be fought as ironclads at sea. This oval form is an extreme development of the form of the *Magenta* and *Solferino*, which has been found to answer so very well, and the peculiarity in the extreme development is that the battery presents a broadside at all points. On each broadside proper there are six guns, and on each of the ends, or bow and stern broadsides, there are two guns firing on a line with the keel. But the two guns do not represent the full end broadside, the aftermost gun on the port and starboard sides, and the foremost gun on the port and starboard sides, training sufficiently round to deliver end broadsides of four guns. It is due to Mr. E. J. Reed, the Constructor of the Navy, to state that this idea of training broadside guns for line of keel-firing at lesser or greater angles is borrowed from his sloop *Enterprise.* The deck of each battery is provided with pilot and gunnery house, as in the ironclads. But let us descend from the deck of the batteries to the yard. The bottoms are perfectly flat, as already stated, and aft there is an abrupt slanting rise of some eight or nine feet, for the accommodation of the screws and rudder. At the time of the writer's visit it was said to be undetermined whether twin or single screws would be supplied, but the impression was that the screws would be twins. Of course the builders knew quite well. This great rise in the stern is a feature at once novel and important. Let us step to the batteries not fully in frame, and we shall see at a glance what it means. It means a very simple and efficient disposal of the screws and rudders in crafts, the like of which, in point of strength and endurance, have not yet been built. The mode of construction is this. The keel of the battery is a series of iron plates, four or five feet broad, with angle iron flanges at the edges. Thus the keel has a depth of four or five feet, no part of which is outside the skin. From this keel lines of keelsons radiate, set as close as they will rivet to the keel; these keelsons being of the same depth as the keel and angle iron flanged above and below. On these angle iron flanges below, the bottom outer skin of the battery is riveted, and on these flanges above the floor the skin of the battery is riveted. Thus the battery may be said to have a solid iron bottom four or five feet deep, the divisions between the keelsons forming a circle of bottom cells. There is a double object in this:—first, the batteries are so strong in the bottom that the bottoms will never be torn out; second, these cells admit of being filled with water when the batteries are to be used for the defence of harbours, and in absolutely still water the filling of the cells will sink the batteries until the guns are laid *à fleur d'eau.* In slightly troubled water the sinking would purposely not be so great, and in sea fighting it is supposed that the higher the batteries then carry their guns the better. The armour of the batteries, resting on two thicknesses of teak, extends well below the water-line, and is carried to the weather deck all round. More truly formidable ships are certainly not afloat, especially for harbour service.

The Shops, Sheds, and Tools.

The shops, sheds, and tools are of as easy enumeration as those in the yards of M. Gouin and M. Normand. The eastern portion of the yard, which is detached from the centre portion, has its simple machinery and tools driven by a small agricultural locomotive engine. And in that portion of the yard two of the oval batteries and two of the merchant ships are in course of construction. When the locomotive is not required to drive machinery in the eastern portion it is available for the centre or western portions of the yard, or for drawing anything heavy about the yard or from the river. Surely this is as it ought to be. With such a fact before us, where is the justification for the erection of stupendous and costly shipbuilding tools in Chatham and the other Dockyards? And where, further, is the wisdom of the extravagant outlays for tools and machinery in so many of our private shipyards? They who make the iron should bend, shape, and drill the iron to the mouldings of the ship, because they would do it better, and at a cheaper rate. The practice answers admirably in Bordeaux and Nantes, and equally well in the French Dockyards. It does not answer in this country, because it has not been tried. True, Messrs. John Brown and Co., of the Atlas Iron Works, Sheffield, have done a great deal of armour-plate and other work from mouldings, and so, no doubt, have the other great firms. But in France there is no other mode of iron shipbuilding thought of, private shipbuilder and Minister of Marine making choice, as a matter of course, of the industrial resources of the country in preference to setting up in the iron manufacturing line themselves. Two or three rude old sheds compose the establishment of the eastern portion of M. Armand's yard. In the centre portion, which is likewise detached, there is a saw-pit and some piles of wood, and there is nothing more but the two other merchant ships in hand and the shipwrights. The western portion of the yard contains the neat offices, the forge, the engineers' shop, the mould loft, and other minor places. The extreme modesty of the yard is scarcely credible. Second, nay third, and even some fourth rate English shipyards are more abundantly supplied. But on the working principle of the French shipyards, shops, sheds, and tools are of little moment. So the work in M. Armand's yard proceeds with spirit. It proceeds also with great success, the reputation of the firm being scarcely, if anything, inferior to that of M. Normand.

Rapidity of Execution in the French Shipyards.

Strange to state, although the French shipyards have a poverty-stricken look in comparison with those of England, experience has proved to the Italian and other Governments that, simultaneous orders given in England and France for the same class of ships, the French shipyards finish and deliver their ships in about half the time of the English shipyards. Were it desirable, facts on this point might be adduced, but the general truth of the statement is well known among English shipbuilders. That is to say, although the French shipyards are destitute of costly machinery and tools, they do their work twice as rapidly as the English shipyards. The explanation is no doubt to be found in the fact, that whereas the English shipyards are full of work, the whole strength almost of a French shipyard admits of being instantly put on foreign work. But Italy, and other countries, do not want explanations, they want their ships. When they give their orders in England they expect those orders attended to with as great promptitude as they are in France. If English shipbuilders think otherwise they are under a delusion, and, unless they amend, they will find that the French shipyards will become the shipyards of Continental Europe. It is a pity that Admiral Robinson and the Admiralty were not aware of this, because it would have strengthened their case against the shipyards, although it would have been still open to the shipyards to have turned round and charged the Admiralty with inability to draw out the specifications of what they want. Whether Italy and other countries, in the matter of the specifications, are able to do what the Admiralty cannot do, does not much matter, the point here insisted on being that it would be an egregious blunder to sneer at the poverty-stricken shipyards of France, when all the nations of Europe which have had ironclads to build have been much better served in France than in England. It is to be regretted that European Governments desiring ironclads in England have not been advised to advertise for tenders, because English shipbuilders would by that means be found to build ships in even less time than Frenchmen.

## CHAPTER XI.

## LA SEYNE.

**A Pleasant Village.*** La Seyne is a pleasant village at the head of Toulon harbour. There, some years ago, an

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* The Mersey is a d set-off to La Seyne. Next to the Clyde, the claims of the Mersey must be acknowledged; while, as regards docks, the Mersey commands the foremost place.

*A Tabular Statement of the Dimensions of all Graving Docks at present constructed in Liverpool. Length on Blocks at Bottom of Dock; Width of Entrance; Depth of Water on Sill t ordinary Spring Tides; Depth of Water on Sill at ordinary Neap Tides.*

| NAME OF DOCK. | Width of entrance. | | Length on blocks on bottom of dock. | Depth of water on sill at O. H. W. Spring Tides. | | Depth of water on sill at O. H. W. Neap Tides. | |
|---|---|---|---|---|---|---|---|
| | ft. | in. | ft. | ft. | in. | ft. | in. |
| Canada lock and graving dock ... | 100 | 0 | 501 | 26 | 0 | 19 | 0 |
| Huskisson lock and graving dock ... | 80 | 0 | 396 | 24 | 9 | 17 | 9 |
| Sandon graving docks— | | | | | | | |
| No. 1, east ... ... ... | 60 | 0 | 540 | 21 | 9 | 41 | 9 |
| „ 2, „ ... ... ... | 70 | 0 | 540 | 21 | 9 | 41 | 6 |
| „ 3, „ ... ... ... | 60 | 0 | 540 | 21 | 9 | 14 | 9 |
| „ 4, „ ... ... ... | 70 | 0 | 540 | 21 | 9 | 14 | 9 |
| „ 5, „ ... ... ... | 45 | 0 | 540 | 21 | 9 | 14 | 9 |
| „ 6, „ ... ... ... | 45 | 0 | 540 | 21 | 9 | 14 | 9 |
| Clarence graving docks— | | | | | | | |
| No. 1, outer gates ... ... | 45 | 0 | 405 | 21 | 3 | 14 | 3 |
| „ 1, inner gates ... ... | 45 | 0 | 291 | 18 | 9 | 11 | 9 |
| „ 2, outer gates ... ... | 45 | 0 | 414 | 21 | 3 | 14 | 3 |
| „ 2, inner gates ... ... | 32 | 10 | 288 | 18 | 9 | 11 | 9 |
| Canning graving docks— | | | | | | | |
| No. 1, „ ... ... ... | 35 | 9 | 441 | 19 | 11½ | 12 | 11½ |
| „ 2, „ ... ... ... | 35 | 9 | 488 | 18 | 3½ | 11 | 3½ |
| Brunswick graving docks— | | | | | | | |
| No. 1, „ ... ... ... | 43 | 0 | 399 | 20 | 9 | 13 | 9 |
| „ 2, „ ... ... ... | 45 | 0 | 399 | 20 | 9 | 13 | 9 |
| Queen's graving docks— | | | | | | | |
| No. 1, „ ... ... ... | 42 | 0 | 438 | 19 | 11¼ | 12 | 11¼ |
| „ 2, „ ... ... ... | 70 | 1 | 435 | 21 | 9 | 14 | 9 |

Englishman named Taylor, attracted by the tideless deep water, established a shipyard, which has since passed into the hands of a company. Stepping from the train at the La Seyne station, some three or four miles on the Marseilles side of Toulon, several railway trucks, some laden with bent armour-plates, some with angle and plate iron, and others with patterns and mouldings, warn you at a glance of what is in store for you at the company's shipyard, and also of the fact that what is true of Bordeaux, Nantes, and of the French Dockyards, applies equally to La Seyne. The La Seyne Company enter the iron markets of France and Belgium, and probably also sometimes of England, with the mouldings and patterns of what they want. Then the company's ships are built, and built, let it be added, on the same terms as ships are built in England when the ships are for foreign Governments, and iron-armed, or iron-clad. The La

DRY OR GRAVING DOCKS AT BIRKENHEAD, &c.

| Name of Dock. | | Width of entrance. | Length of blocks at bottom of dock. | Depth of water on sill at O. H. W Spring Tides. |
|---|---|---|---|---|
| | | ft. | ft. | ft. in. |
| No. 1, new dock, | Constructing ... ... | 85 | 750 | 25 9 |
| " 2, " | | 50 | 750 | 25 9 |
| " 1, dock, | Belonging to Laird Brothers ... ... | 40 | 300 | 16 6 |
| " 2, " | | 45 | 180 | 16 6 |
| " 3, " | | 65 | 400 | 24 3 |
| " 4, " | | 85 | 440 | 20 6 |

The total area and quay space of the Liverpool and Birkenhead Docks is as follows:—

| Name of Docks. | Water area. | | Quay space. | |
|---|---|---|---|---|
| | Acres. | Yards. | Miles. | Yards. |
| Liverpool ... ... ... ... | 251 | 2,664 | 18 | 763 |
| Birkenhead ... ... ... | 121 | 2,869 | 5 | 786 |
| Total ... ... | 372 | 5,533 | 23 | 1,549 |

Seyne Company, it is believed, have built for Spain and Italy on the same terms as the Thames Iron Works and the Millwall Iron Works, and other English firms. This may seem strange, and even impossible, when the delay and transport are considered, but the fact has its expla-

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*P. incipal Dimensions of other Dry Docks of* 300 *Feet in Length, and upwards, in Great Britain and elsewhere*—1862.

| NAME OF PORT. | NAME OF DOCK. | Length over all. | Breadth of entrance. | Depth of water over sill at O. H. W. |
|---|---|---|---|---|
| Leith ... ... | On the East Sands ... | 400 | 71 | 23 |
| Sunderland ... | Laing's ... ... ... | 300 | 48 | 14 |
| „ | Commissioners ... ... | 315 | 45 | 16·8 |
| West Hartlepool... | No. 1 ... ... ... | 375 | 60 | 16 |
| „ ... | No. 2 ... ... ... | 355 | 50 | 17 |
| Great Grimsby ... | No. 1 ... ... ... | 400 | 70 | 19·6 |
| Thames ... ... | Northfleet ... ... | 400 | 74 | 19·6 |
| „ | New Crane ... ... | 463·6 | 43·9 | 14·6 |
| „ | Union (upper) ... ... | 331·6 | 39·8 | 15 |
| „ | Regent, No. 12 ... ... | 338 | 42·2 | 16 |
| „ | Green and Co. ... ... | 342 | 62 | 18 |
| „ . | General Steam ... ... | 328 | 40 | 14 |
| Portsmouth ... | Camber Dock ... ... | 345 | 50 | 17·3 |
| Isle of Wight ... | Cowes ... ... ... | 330 | 36 | 16·6 |
| Plymouth ... | Mill Bay ... ... ... | 367 | 80 | 27·6 |
| Falmouth... ... | No. 1 ... ... ... | 360 | 54 | ·14 |
| „ | No. 2 ... ... ... | 400 | 90 | 20 |
| Appledore ... | ... ... ... | 326 | 43·3 | 15 |
| Bristol ... ... | Great Western ... ... | 300 | 45 | 13 |
| „ | Albion ... ... ... | 380 | 38·6 | 13·6 |
| „ | Green ... ... ... | 323 | 56 | 15 |
| Cardiff ... ... | East Bute ... ... | 435 | 48 | 18 |
| Swansea ... ... | No. 3 ... ... ... | 300 | 36 | 16 |
| Holyhead... ... | ... ... ... | 307 | 62 9 | 17 |
| Greenock... ... | Steel ... ... ... | 361 | 47·8 | 16 |
| „ | Scott ... ... ... | 300 | 45 | 15 |
| „ | Corporation ... ... | 360 | 38 | 13 |
| Dumbarton ... | ... ... ... | 300 | 41 | 13 |
| Glasgow ... ... | Tod and M'Gregor ... | 500 | 56 | 18 |
| Dublin ... ... | No. 1 ... ... ... | 400 | 70 | 18 |
| Londonderry ... | ... ... ... | 321 | 50 | 18 |
| Cork ... ... | West Passage ... ... | 390 | 86 | 24 |
| „ | Wheelers... ... ... | 420 | 59 | 20 |
| Trieste ... ... | Austrian Lloyd's ... | 300 | ... | 25 |
| Bombay ... ... | Old Dock... ... ... | 613 | 51·9 | 16 |
| „ . | Duncon Dock ... ... | 600 | 63 | 16 |
| Singapore ... | New Harbour ... ... | 390 | 43 | 15 |
| „ | „ | 450 | 62 | 18 |
| Canton River ... | T. C. Couper ... ... | 550 | 72 | 17 |
| Amoy ... ... | „ | 300 | ... | ... |
| Australia ... ... | Cockatoo Island... ... | 306 | 58 | 20·6 |
| „ | Morts, in Waterview Bay | 345 | 75 | 19 |
| Rio Janeiro ... | Cobras Island ... ... | 301 | 70 | 28 |

nation in the lower rate of French wages, especially at La Seyne. Taking the road from the La Seyne station through the village, a half-hour's walk brings you to the entrance of the La Seyne Company's works.

The La Seyne Company's Works.

The La Seyne Company's works contrast favourably with those of Bordeaux, Nantes, and Havre. The offices are as orderly and complete, if not even more so, than those of Messrs. James Ash and Co., Cubitt-town. You enter a capacious, well-matted hall, ascend a covered and neatly-finished stair, and to the right and left are the drawing-office, the clerk's office, and the private office. Leaving the offices and entering within the yard, the same orderliness, neatness, and completeness greet you at every turn. The shops, in addition to architectural uniformity, possess well glazed windows and unexceptionably painted doors. On the doors the names of the shops are painted. At the time of your visit the workmen are admitted at the gateway, and present a respectable throng of nearly three thousand.

The Yard.

The yard, laid out on the waters of Toulon harbour, presents a long, narrow strip, with several stonebuilt and greatly elevated slips. Behind

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The principal Mersey shipbuilders are the
Messrs. Laird Brothers.
" Jones, Quiggan, and Co.
" Thomas Vernon and Sons.
" R. G. Glover and Co.
" W. H. Potter and Co.
Mr. W. C. Millar.

The Messrs. Laird are the well-known builders of the so-called Confederate rams, and at present they have in hand the *Agincourt*, of the *Minotaur* class. Mr. Jones, of Messrs. Jones, Quiggan, and Co., is the inventor of the angulated iron target. The new tonnage of the Mersey for the present year will probably amount to 80,000 tons, to be constructed within the year.

the slips there are the offices, shops, and a considerable extent of vacant ground. Practically, any amount of shipbuilding might be carried on within the yard, and building for some time past and at present is very active. Here Italy has hadits best iron-armoured ships turned out in a very short time, and here also have been built many of the fine iron steamers of the *Messageries Impériales*. The feature of the yard however is, as in the other French shipyards, that very little machinery and very few tools suffice for all purposes—for giving nearly three thousand iron shipwrights constant occupation. Conspicuous among the tools is an old-fashioned machine, which on the one side punches boiler plate holes, and on the other side clips boiler plate. Then there are the simple appliances for bending skin and frame plates, and giving the flange to angle iron. Beyond those, the yard may be said to contain nothing but the pattern shop, the joiners' shop, and the shipwrights' shop. A single half-hour amply suffices for your visit, and you hasten to catch the last boat from the village to Toulon. La Seyne, like Bordeaux, Nantes, and Havre, has but one shipyard.*

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* The *Times* of June 28, 1864, has the following paragraph in relation to the La Seyne Company's works:—

"The great iron company of Marseilles have just completed, at their dockyard at La Seyne, near Toulon, an iron-plated steam gunboat, on a new model. It has already been tried, and the result was most satisfactory. It may be easily separated into 18 pieces, and each of these forms a small boat, which may travel over land or navigate the sea with equal facility. The gunboat, when entire, accomplished 8½ knots an hour. When taken to pieces a whole fleet of gunboats may be moved from one place to another by railway at the rate of 35 miles an hour."

## CHAPTER XII.

## THE FRENCH MARINE.

The Present State of the French Marine.

From a purely English point of view the present state of the French marine is eminently unpromising. It seems incapable of any great expansion, partly from the dislike of Frenchmen to investments in shipping, partly from the want of bulky domestic products—the possession of which is a great stimulus to shipping—and partly from the operation of the inscription maritime. Let us glance at those obstacles in detail, and afterwards consider the subject from a purely French point of view.

French Dislike to Shipping Investments.

On inquiry it will be found that the dislike of Frenchmen to shipping investments is universal. In the first place, and by way of accounting for the fact, a ship to be employed must be out of sight. This being out of sight is what Frenchmen do not fancy. They have a weakness to see their property. What they possess they desire to have before them. In proof of this it may be stated that, if you have a French friend who is a shipowner, it is at any time a safe bet that his ship or ships will then be found tied up in front of his office, or within sight of his office. A

French shipowner has the same tenderness for his ships as an English gentleman with a stud has for his stud, or as an English spinster with cats has for her cats. French ships are suffered to go away with great reluctance, and, when away, the rule is that it is only for a short time that they must be absent. As soon as possible they must be once more tied up in front of the office, or within sight of the office. French ships, as a rule, go from French port to French port, or from a French to a foreign port, and back again. The cases are exceptional in which French ships are found engaged in the trade between foreign countries. Perhaps there are few or no cases on record of French ships making consecutive voyages between foreign ports. Such a proceeding would interfere with the tying up in front of the office or within sight of the office, as often as is wished. In the second place, and by way also of accounting for the fact, Frenchmen are continually apprehensive of trouble. They are in perpetual dread of war, and think that in war French ships may practically be considered a total loss. Especially in a war with England, the impression is that French ships would be swept from the seas. So for those two reasons the state of the French marine by no means bears out the expectations that were recently formed of it in case of war between England and Germany. The carrying trade of England would not pass to French bottoms. The French marine is positively incapable of receiving an extension that would be dangerous to the peace and well-being of the United Kingdom. French shipowners must first be made of the adventurous stuff entering into the composition of English and American shipbuilders. When that will happen it is needless to inquire.

The Want of Bulky French Products.

France produces silks, which occupy little room, and wine, the aggregate bulk of which bears no comparison with the coal bulk of a single ordinary English coal-lading port. The surplus agricultural products are also at the best inconsiderable. Thus France is destitute of any great home encouragement to shipping, and the French marine therefore suffers. Were France, like England or America, a country supplying the world with cheap bulky products, Frenchmen would soon become reconciled to ships, because those interested in the transport of the cheap bulky products would be continually demanding those facilities without which their business could not possibly be carried on. Let any Englishman pass a few days in an English coal-port, when the wind prevents the colliers returning northwards, and he will comprehend the impulse that shipbuilding occasionally receives. At a street corner, on the Exchange, anywhere that those interested in coal assemble, nothing but growling will be heard; and were he privileged to follow some of the growlers home, he would learn that hereafter it is impossible to depend solely on wind and sails. In Newcastle it has been said that a week of adverse wind is almost sure to lead to the ordering of a dozen steam colliers. France has no such pressure put upon it by the elements. France has no class demanding ship facilities for domestic industry, and shipowning in France at the present time is accordingly, as it always has been, in doubtful and apathetic hands.

The Inscription Maritime.

Then, last of all, the inscription maritime exercises a baneful influence. In what may still be called the good old times of English shipowning—the still existing condition of things in the

United States—any one might become the mate or master of an English ship who had the means to build one. Such a regulation necessarily presented the *maximum* of attraction, not merely to a seafaring life but to investment in shipping. The inscription maritime, on the other hand, inasmuch as it lays hold of all seamen, and imposes disabilities on the seaman which are not thought of in the conscription for the army, offers the *minimum* of attraction both for a seafaring life and for owning ships. In France there is the least possible inducement to become a sailor. And if to become a sailor is not encouraging, must not the French shipowner think sometimes of his fate, were the market at any time to be completely drained of sailors? Investments must necessarily be restrained, capital must seek employment in other channels, and the few sufficiently enthusiastic to become shipowners may perhaps be pardoned the extraordinary weakness of having their ships tied up in front of their office or within sight of their office.

The English Point of View.

Of the French marine, therefore, the English point of view is unfavourable. The French are not likely, in our day at least, to become great shipowners. When the inscription maritime has been modified, and bulky products provided, it is reasonable to assume that French investments in shipping will be promoted. Until then the paralysis of the carrying trade of England practically implies the paralysis of the carrying trade of all nations. Had not the American war been raging, war between England and Germany would have led to a large immediate transfer of the English carrying trade to the neutral flag of the United States, assuming that the Germans would have seriously molested English commerce, but as long as the American war lasts there will be no better flag than the English, because the French marine is wholly impotent.

The French Point of View.

The French look at their marine simply from the protective and free-trade point of view, wholly ignoring the inscription maritime, the want of bulky domestic products, and the dislike of Frenchmen to investments in shipping. In the course of the recent debates in the Corps Législatif, M. Ancel said—" I will now only say a few words in reply to the interpellation which M. Pouyer-Quertier addressed to me as President of the Havre Chamber of Commerce. The hon. member truly remarked that the shipping interest is in a suffering state, and that very few vessels are being built for mercantile purposes. We anticipated this in 1860, when we opposed the repeal of the differential duties in favour of our flag. In consequence of the suppression of those duties our navigation to Australia has ceased, and that to the East Indies has greatly diminished; not because of any inferiority in our vessels or sailors, but simply from the want of freight. India chiefly consumes English goods, and when the differential duties were abolished we could not compete with the English. Our manufacturers are now obliged to go to England for cotton and wool, which are always brought over in English vessels. The Vice-President of the Council of State says that the present state of things is a consequence of the treaty of 1826, but that treaty made reserves in our favour which the treaty of 1860 has abolished. That is the cause of the present depressed state of the shipping interest. Instead of importing cotton, jute, and coffee from the countries producing them, we now get them from England. No less than 26,000 sacks of coffee have been brought to Havre in six months by the regular English steamers. That fact is certainly deserving of notice. We have been told that our complaints are unfounded, as our merchant shipping considerably increased in 1855, 1856, and following years. That development was owing to the hope of the prompt re-establishment of peace with Russia, and to confidence in the stability of the legislation, which has since been so profoundly modified. I have, however, too strong a faith in the energetic vitality of French genius to admit that we have relinquished all hope of recovering lost ground. It is only necessary for the Government to apply a prompt remedy to real evils in order to secure the future of our merchant navy and the existence of our markets. We shall soon have to discuss laws relating to the sugar tariffs, which, I hope, will give satisfaction to both the shipping and mercantile interests. The French shipowner must be delivered from many heavy charges which are unknown to the English shipowner. Shipbuilding must be promoted by allowing the free admission of raw materials, many of which still pay the same dues as under the protective system. Not a few shipowners purchase ships abroad, and keep them under a foreign flag to avoid paying the heavy duties exacted on naturalising them. The changes I recommend are of vital importance to an industry which forms part of our natural strength; the existence of our markets is at stake, and they must be secured at any price. The war in America is one great cause of the present situation, and in that respect French and English interests are very distinct. England might rejoice at the destruction of the American Union in order to get rid of a formidable rival; but France, on the contrary, is interested in its maintenance. All nations come to Havre to purchase cotton, and if the tariffs had been prudently upheld the produce of India, instead of all going to England, would have supplied Havre and Bordeaux. An Address ought to be respectful, but at the same time to speak the truth; and I appeal to any of the representatives of French ports whether the Government has done right in taking the lead of public opinion in adopting the measures which it has decided on.

"To this M. Pagezy answered—It is impossible for me to join in the opinion expressed by M. Ancel. I represent the port of Cette, which I do not deny has suffered in its shipping interests, but from purely accidental causes. It has been said that the treaty of commerce has rendered the French merchant shipping inferior to that of many other nations, but the same complaints were made long before that measure had been adopted. The present state of things is beyond doubt principally caused by the war in America. Before the treaty cotton and other raw materials were not imported by French vessels. Since the treaties of 1822 and 1826 they had been brought by American vessels. The greatest part of the cotton now comes from India *viâ* England, and though the port of Havre may suffer, other places—such as Boulogne, Dieppe, and Dunkirk—have gained by it. What would be said at Havre if that port were, like those ports on the coasts of the Mediterranean, situated near one like Marseilles, which, from being exempted from all navigation dues, causes material injury to Cette, Agde, and Toulon?

"M. De Forcade la Roquette, Vice-President of the Council of State—I shall not return to the discussion, which appears to me to be exhausted, but merely reply to remarks which have been made relative to shipbuilding. In 1862 the number of sailing vessels on the stocks or launched was 831, measuring 42,717 tons, and that of steamers 32, and 9,722 tons. In 1859, before the treaty of commerce, the numbers were 634 and 15, measuring respectively 34,000 and 2,567 tons. I think the hon. gentlemen who made the complaints on the subject will be pleased to see that their fears are groundless. I shall now speak of the great question of our shipping. We must bear in mind that our ports demanded a treaty of commerce in the first instance; they adhered to it, and they thanked the Government for concluding it. Nor will they at the present day be unfaithful to the principles they have always upheld. Let us take four of them in succession. Marseilles not only adheres to the treaty but wishes to go beyond it: its Chamber of Commerce will tell you that the only thing it fears is to see the Government stop in its liberal course. Bordeaux! There are representatives of that city in this Chamber, and I cannot think that they will abandon the principles they have maintained for thirty years. Nantes! It was mentioned yesterday as a fact that the Chamber of Commerce had given in its resignation. The Chamber of Commerce of Nantes has not done so.

"M. J. Brame observed that if the industrial cities which he represented were in a prosperous state, the same could not be said of all the manufactures of the country. He would abstain from citing figures, as many of those quoted were contradictory, and it would puzzle the brain of a mathematician to understand those of M. Javal. But what was the state of metallurgical industry, and of that of naval constructions? There was no ship on the stocks at the present day in any part of France.

"M. Rouher, Minister of State—That is incorrect.

More ships were built in 1863 than in the years immediately preceding; more even than in 1859.

"M. J. Brame—It has been said that Marseilles is in a prosperous state; nevertheless Marseilles demands an inquiry. The Government is well aware of the state of our ports in general. It knows that all manufacturers are calling for protection at this moment; that there are solicitations for duties of all sorts, high and low, and for favours of every species. And how does the Government act? It resolutely opposes all these demands, saying it can do nothing; then it gives premiums to French shipping; it lowers the duty, to the loss of the Treasury, on certain salts used in chemical products, and in that way a mistake in the treaty of commerce is repaired.

"M. Rouher—Not at all. That is incorrect.

"M. J. Brame—The Government is obliged to give premiums; it gives 350,000f. per voyage to Transatlantic steamboats worked by a free trade company, who pocket the sum without any repugnance. We have been told that the treaty of commerce was not made for producers only, but also for consumers. Yet the cheap living which we were led to expect, where is it to be found? There was, indeed, a reduction of 80 millions of taxes at the time of the treaty of commerce, but 150 millions have been again imposed since that time for absolute necessities. Do not pretend that you have succeeded because you have cut the Gordian knot. The English took twenty-five years to carry out their system of commercial reform. M. Chevalier has said, 'Industries that make no profit perish, and there an end.'

"M. A. Chevalier—I never said that.

"M. J. Brame—Perish, then, our maritime industry! perish our ironworks! We are here to fulfil our mandate. The idea of blame does not exist in our amendment, as M. Javal has supposed; but it is our duty to speak the truth, fully and completely, and also in the most respectful manner."

The Customs Statement.

The Director-General of Customs has published returns of the traffic carried on by French coasting vessels during 1862. The total weight of the merchandise of every description carried from one French port to another, either in the Atlantic or in the Mediterranean, is set down at 2,452,464 tons in 1862, while it amounted to only 2,404,709 tons in 1861. The traffic between the ports on the Atlantic amounted to 1,734,581 tons, and that between the ports in the Mediterranean to 697,883 tons. The great coasting trade, or that carried on between the ports on one sea and those on the other, figures at 74,899 tons, and the little coasting trade, or that carried on between ports in the same sea, for 2,378,165 tons. Of the 2,452,464 tons of merchandise carried by coasting vessels, Bordeaux despatched 303,408; Havre, 296,472; and Marseilles, 232,732. Next come Arles, Nantes, Rouen, Lille, Dunkirk, Honfleur, Charente, Rochefort, and Plaigne. Among the ports receiving merchandise Marseilles continues to occupy the first rank, with 260,462 tons; Bordeaux the second, with 198,349; Rouen the third, with 194,473; Havre the fourth, with 162,948. Next come Brest, Nantes, Dunkirk, Libourne, Cette, Arles, Caen, and Toulon. On examining the various merchandise carried by coasting vessels we find—timber, 350,883 tons; various materials for building, 335,598; corn and flour, 298,190; salt, 171,527; iron and steel, 128,856; coal, 102,599; and wine, 170,775 tons. The ships employed in the coasting trade performed 79,332 voyages in 1862 against 77,123 in 1861, and measured 3,198,805 tons, in place of 3,102,886. The large coasting vessels performed 440 of these voyages, and measured 68,270 tons. There were 8,496 steam vessels, measuring 844,546 tons, employed in the coasting trade in 1862, being an increase of 140 ships and 52,374 tons as compared with the year 1861. The merchandise carried from one port to another in Algeria during the year 1862 amounted to 53,445 tons, being a decrease of 18 per cent. as compared with the year 1861.

First Report of the French Committee.

The first report of the French committee appointed on the solicitation of Mr. W. S. Lindsay and M. Rouher, was published in Paris recently. The prefatory matter consists of an interesting report, addressed by M. Rouher, who acted as chairman of the committee, to the Emperor, explaining the reasons for instituting the inquiry. The Commercial Treaty of 1860 was necessarily followed by certain modifications in the *régime* of the commercial navy. The laws of the 5th and 23rd of May of the same year, the decrees of the 16th of January and the 24th of June, 1861, those relating to the tariff of raw material, and that of colonial produce, produced a considerable change in the differential duties and the surtax on shipping; and the law of the 3rd of July of the same year declared the commercial emancipation of the colonies. These reforms were criticised more or less warmly by the Chambers of Commerce at the principal ports of the empire. Some thought they were a grave injury to the interests which they represented; others judged that the commercial reforms once begun should extend to the merchant navy as well as to other branches of trade, and they required that its situation should be examined into with the view of aiding it; and all were agreed on the necessity of instituting a careful inquiry, where every opinion should be heard. After explaining in a few words the causes that led to the present step, M. Rouher gives an account of the various systems which were successfully applied in France to the merchant navy. It appears that previous to the Revolution of 1789 foreign ships encountered in French ports no absolute impediment; and for more than a century—that is, from 1640 to 1740 and 1765—they were only subjected to a duty of 50 sous the ton, from which Holland was relieved at the Peace of Utrecht. In 1740 and 1765 the duty on foreign shipping in French ports was raised to 5f. the ton for international navigation, and 10f. for the coasting trade. The new tax did not, however, continue long undisturbed. The concession in favour of Holland was successively granted to the Hanseatic cities, to Denmark, Sweden, and England; and foreign vessels only employed on the coasting trade continued to pay the 10f. duty. The Spanish flag, in virtue of the Family Pact, enjoyed in French ports the same advantages as French shipping. After the Revolution of 1789 the Constituent Assembly undertook the unification of the French tariff, and did so at first in accordance with the liberal principles which then predominated. In the tariff promulgated on the 15th of March, 1791, there was nothing reserved in favour of the French navy, which freely competed with foreign ships. This state of things, however, was of short duration. Two years later—namely, on the 1st of March, 1793—the Convention annulled all the treaties of alliance and of commerce concluded by France with foreign Powers;

and six months later passed the Navigation Acts (modelled on that of Cromwell in 1651), which excluded the foreign flag from maritime operations in France, and confirmed the prohibition of the coasting trade, and of all intercourse between France and her colonies by foreign ships. During the wars of the Revolution and the First Empire these measures could not be applied, and numerous exceptions had to be made in the interest of the commercial and manufacturing interest, in favour of neutrals as regarded direct importation and the coasting trade. When peace was restored the naval material was insufficient for the wants of the community, and the Government, unable to revive in all its force the Navigation Act of September, 1793, had to make concessions.

The Writer's Observation.

So far as the writer's observation extended—from Havre to Cherbourg, Brest, Nantes, Lorient, Rochefort, Bordeaux, and Toulon—there were not in France a dozen merchant ships in hand. Any of the considerable Thames shipyards are, therefore, just now building more merchant tonnage than the whole shipyards of France. War—not commerce—occupies the attention of the French shipyards. Obviously, at the bottom of the depression and slow growth of the French marine, there is something more potent than the operation of Mr. Cobden's treaty. So far as that treaty went, if English experience is worth anything, it has a tendency to stimulate the industry of France, and indirectly to augment the tonnage. But as long as the commodities of a country are insignificant in bulk when of little value, and practically of no bulk at all when of great value—as is the case with silks—it must, on reflection, be vain to aspire to the possession of such a marine as that of England or America. England sends its coal and iron, its cottons and woollens, hardware and chemicals to every corner of the world. Upon every country it waits with its produce. So it is with America. The forests of the New World are exhaustless, and unless the timber, when hewn, were delivered in the markets of the world, it would be in some danger of never being consumed at all. And this is equally true of American grain. The great granaries of America on Lake Michigan have only in two or three cases been approached by European vessels; the ships of the country being the carriers to tide water at New York or Montreal. In a word, England and America, by the mere force of circumstances, have provided fleets of merchant ships which no laws of France or any other country can possibly supersede. As well might a joint-stock bank, established in London, with the power of issuing its own notes, hope to displace the circulation of the Bank of England.

What the Emperor Thinks.

In the faith of the expansion of the French marine it is apparent the Emperor has no faith. Did he believe in it, it would be superfluous to provide for the wants of the Navy as regards men in the way he sanctions, and no doubt by this time some prospect of relaxation from the rigour of the inscription maritime would have been held out to the seafaring classes. Fortunately for France, the Emperor is not singular in his belief, for were there anything extraordinary to be made out of shipping—were there room for as many French merchant ships as there are English or American merchant ships, it is possible that a sufficient number of strongminded French capitalists would be found to invest the needful means. The carrying trade of the world is at the present time well provided for; and if Frenchmen do not occasionally share its profits, it ought to be a satisfaction to them that they escape its losses. As a whole, the returns from capital invested in merchant shipping, whether in England or America, are less satisfactory than in almost any other branch of industry. Some years ago the well-known American economist, Mr. Cary, went so far as to affirm that the providing of shipping was ruinous to the United States; in other words, that American capital could always, as a rule, be more profitably employed in other channels.

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